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Risk and Efficiency in Banking: A Comparative Study between Islamic and Conventional Banking

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Risk and Efficiency in Banking: A Comparative Study between Islamic and Conventional Banking

By

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AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award without prior agreement of the Doctoral College Quality Sub-Committee.

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To be able to produce a study that serves my religion by any means is always a privilege which I thank Allah first and last for helping and guiding me to work on this study. I then find myself in a place where I thank Dr. Simon Ashby who has always been giving me the spirit to work on this study. Dr. Ashby's endless efforts have always provided me with the right path in which I find myself at this advanced stage. I also thank Dr. Basel Alawarti who supported me through this study. I cannot forget to thank my mother who was supporting me at each stage during my study. I also thank my wife Sumaiah, my brothers and sisters especially Abdullah, Jama'n, Kholoud and Nada who were my motivation sources throughout my study.

Abstract

Purpose: The main aim of this study is to address the current gap in banking risk and efficiency literature by investigating risk and efficiency levels, identify risk and efficiency determinants. This thesis examines banking risk from one side and efficiency from another. The study also provides a comparative study between Islamic and conventional banking in an effort to provide clear, wide, understandable results.

Methodology: The study's methodology will be applied according to three main steps: first, estimating risk and efficiency levels. Second, investigating risk and efficiency determinants. And finally, identifying those potential variables affecting risk and efficiency through the SUR approach. Risk and efficiency levels are as follows; Risk figures by applying three potential risk indicators and efficiency levels through The Data Enveloping Analysis (DEA) approach. The study will also apply the methodology in two different scenarios: first, with Islamic banks; and second, with conventional banks. This step is taken in order to present comparable results amongst the different banking systems, which would produce clearer, wider and more understandable findings.

Sample: The study covers a sample of major banks in the MENA area for the period spanning 2006–2015. Countries included Saudi Arabia, Kuwait, Qatar, Bahrain, United Arab Emirates, Jordan, Turkey, Egypt, Tunisia and Sudan.

Results: After using two proxies to measure credit risk, the study has found that credit risk in Islamic and conventional banks is similar. A slight rise in loan loss reserve for conventional and a slight rise in non-performing loans in Islamic. The overall results show a similar credit risk levels in both Islamic and conventional banks in MENA. Insolvency risk was different, as Islamic banks reported higher risk levels compared to conventional banks. Z scores were higher in conventional banks indicating that insolvency risk in Islamic banks was higher. The study has found that efficiency levels in Islamic banks were also similar to efficiency levels in conventional banks. The Sharī'ah' compliance regulations did not affect the level of efficiency in Islamic banks performing in MENA. The study has investigated the impact of the global financial crisis on credit risk, insolvency risk and efficiency. The study found Islamic and conventional banks in MENA experienced an increase in credit risk. Both Islamic and conventional banks were less stable after the global financial with lower Z scores reported after the crisis. Banks in MENA were more efficient after the crisis. Efficiency scores were higher after the crisis compared to those reported before or during the crisis.

Keywords

Risk management, Conventional banks, Islamic banks, GCC, Mena, Bank efficiency, Bank performance, Islamic *Sharīʿah*, Credit risk, Insolvency risk,, Saudi Arabia, Kuwait, Qatar, Bahrain, United Arab Emirates, Egypt, Turkey, Jordan, Tunisia, Sudan. GCC. MENA.

{الَّذِينَ يَأْكُلُونَ الرِّبَا لاَ يَقُومُونَ إِلاَّ كَمَا يَقُومُ الَّذِي يَتَخَبَّطُهُ الشَّيْطَانُ مِنَ المَسِّ ذَلِكَ بِأَنَّهُم قَالُوا إِنَّمَا البَيعُ مِثْلُ الرِّبَا وَأَحَلَّ اللهُ البَيعَ وَحَرَّمَ الرِّبَا فَمَن جَاءَهُ مَوعِظَةٌ مِن رَبِّهِ فَانتَهَى فَلَهُ مَا سَلَفَ وَأَمرُهُ إِلى اللهِ وَمَن عَادَ فَأُولَئِكَ أَصحَابُ النَّارِ هُم فِيهَا خَالِدُونَ * يمحَقُ اللهُ الرِّبَا وَيُربِي الصَّدَقَاتِ وَاللهُ لاَ يُحِبُّ كُلَّ كَفَّارٍ أَثِيم * إِنَّ الَّذِينَ آمَنُوا وَعَمِلُوا الصَّالِحَاتِ وَأَقَامُوا الصَّلاَةَ وَآتَوُا الزَّكَاةَ لَهُم أَجرُهُم عِندَ رَبِّهِم وَلاَ خَوفٌ عَلَيهِم وَلاَ هُم يَحزَنُون * يَا أَيُّهَا الَّذِينَ آمَنُوا اتَّقُوا اللهَ وَذَرُوا مَا بَقِيَ مِنَ الرِّبَا إِن كُنتُم مُؤمِنِين فَإِن لم تَفعَلُوا فَأْذَنُوا بِحَربٍ مِنَ اللهِ وَرَسُولِهِ وَإِن تُبتُم فَلَكُم رُؤُوسُ أَموَالِكُم لاَ تَظلِمُونَ وَلاَ تُظلَمُون *}

[البقرة: 275 - 279].

Verse 275: Those who devour *'Riba'* interest (usury) will not stand (on the Day of Resurrection) except like the standing of a person beaten by *'Shaitan'* Satan leading him to insanity. That is because they say: "Trading is only like *'Riba'*," where as Allah has permitted trading and forbidden *'Riba'*. So who-so-ever receives an admonition from his Lord and stops eating *Riba*, shall not be punished for the past; his case is for Allah (to judge); but whoever returns (to *Riba*), such are the dwellers of the Fire—— they will abide forever therein.

Verse 276: Allah will destroy (deprive of blessings when taking *Riba*) *Riba* and will give increase for *Sadaqat* (deeds of charity, alms). And Allah likes not the disbelievers, sinners.

Verse 277: Truly, those who believe, and do deeds of righteousness, and perform *As-Salat (Iqamat-as-Salat)* prayers, and give *Zakat*, they will have their reward with their Lord. On them shall be no fear, nor shall they grieve.

<u>Verse 278:</u> O you who believe! Be afraid of Allah and give up what remains (due to you) from *Riba* (from now onwards) if you are (really) believers.

<u>Verse 279:</u> And if you do not do it, then take a notice of war from Allah and His Messenger but if you repent, you shall have your capital sums. Deal not unjustly (by asking more than your capital sums), and you shall not be dealt with unjustly (by receiving less than your capital sums).

Quran: Chapter 3 , Sura: 2 'Al Baqarah', Verse: 275- 279

DEDICATION

This thesis is dedicated to my entire family. Thank you all for your love, patience, sacrifice and endless support

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Glossary of Islamic Financial Terms

Concept	Definition
Sharī'ah:	Refers to the guidelines that regulate all operations according to the Qura'n and Sunnah.
Mudārabah:	An agreement between two individuals as one individual to provide finance and the other to provide entrepreneurship.
Mushārakah:	A financial method whereby all the partners share in equity as well as Management.
Ribā:	Equal to interest in the normal financial systems.
Gharar:	Doubt of outcome produced by unclear conditions in contracts of deferred Exchange.
Sukuk	Financial certificate in Islamic finance, similar to a bond in Western finance, with the accordance to Sharī'ah law.
Salam	The holder of a *Salam* certificate privileges commodities, products and services in a stated future date.
Murābahah	Sale at a specified profit margin.
Islamic Windows	Sharī'ah' Compliance products and services offered by Conventional banks

1. Introduction

Many different academics and policy makers have come to recognise the benefits associated with Sharī‘ah-compliant financial products, with the equity and risk-sharing aspects seen to balance out any misalignment between short-term demandable deposit contracts and long-term uncertainty in loan contracts. Furthermore, such Sharī‘ah-compliant products are recognised as appealing for different portions of the population that seek to acquire financial services that are in line with their beliefs.

Although it remains that Sharī‘ah-compliant financial assets continue to make up only a small portion of worldwide banking assets (Financial Times, 2014). Islamic finance remains concentrated primarily in some oil-exporting countries, with the Gulf Cooperation Council countries, plus Malaysia and Iran, accounting for more than 80% of the industry assets, which we estimate will reach $2.1 trillion by the end of 2016. (S&P Global Ratings).

In line with the above, this thesis draws a comparison between Islamic and conventional banks in terms of risk and efficiency, utilising a number of different factors constructed from income statement and balance sheet data, utilising a sample made up of ten countries offering both conventional and Islamic banking options. Furthermore, the performance of both types of banks are analysed and assessed across banking systems overall and the recent global financial crisis in particular. Therefore, this thesis provides insight into a subject of a considerable debate. Although the key aspects of Sharī‘ah-compliant financial services highlight clear differences in the business models adopted by conventional and Islamic banks, respectively, and further illustrate the greater stability and efficiency demonstrated by Islamic banks, it is argued that conventional banks might differ in their form but ultimately demonstrate comparability in substance, and also that Islamic banks cannot be viewed as more beneficial when considering stability and efficiency (Kuran, 2004).

From a theoretical standpoint, Islamic finance is seen to vary significantly when compared with more conventional finance options. In particular, financial options that are Sharī‘ah-compliant do not permit the charging of interest, for example, with goods and services only permitted to carry a price, not to be open to speculation, and altogether prohibiting the financing of particular illicit activities. At the same time, however, finance in the Sharī‘ah-compliant domain depends on the concept of profit-

and loss-sharing, meaning there is a need for all risk to be shared by all parties, with both the asset side and liability required to adhere in this regard, with the view that all transactions should be supported by a real economic transaction with a physical asset at its core. This implies clear differences when considering Islamic and conventional banks' activity and funding structures. More realistically, however, scholars in the Islamic arena have devised products that are comparable to conventional banking products, although interest rate payments and discounts have been replaced with more contingent payment structures and fees.

In this vein, as an example, it has been found by Chong & Liu (2009) that, in the specific context of Malaysia, only a small portion of Islamic bank financing is centred on the critical concept of profit-loss sharing, with Islamic deposits not seen to be interest-free, but rather similar to more conventional deposits, as established in the work of (Khan, 2010), which took a sample of large Islamic banks across a number of different countries. Furthermore, across Islamic banks, much popularity has been seen in lease-like products, with these seen to be linked to real-sector transactions. However, Islamic banks, along with their depositors, have been seen to take residual equity-style risks, with such actions having implications for the agency relationships on both sides of the balance sheet. In this regard, attention will be directed towards balance sheets, as well as testing whether or not the differences recognised in the business model can be seen to products results in terms of funding structure and income, in addition to intermediation efficiency.

Importantly, theory is not able to provide sound predictions in terms of whether or not Islamic banks can be considered more stable or cost-effective than conventional banking institutions. In one way, it might be seen that depositors' inclination to monitor and discipline banks could be improved through the equity-type nature of savings and investment deposits; on the other hand, deposits' equity-type nature could be seen to affect the incentives of the banks to monitor and discipline lenders owing to the fact they do not face any immediate threats amongst depositors in regards withdrawal, although overall asset riskiness could be seen to increase.

Moreover, restrictions implemented across Sharī'ah products are recognised as able to increase asset concentration whilst also reducing the overall application of hedging instruments across banks. Ambiguity comparable in this regard can be seen to relate

to Islamic banks' efficiency. On the one hand, in Islamic banks, monitoring and screening could incur lower costs as a result of the lower agency problems; however, in contrast, Islamic banks are seen to be more complex, which could cause greater costs and lower efficiency amongst such institutions. Moreover, the older and more established a bank, the lower the cost structures, meaning Islamic banks might be seen to face higher costs.

For the period spanning 2006–2015, a sample of conventional and Islamic banks were taken in an effort to evaluate whether or not there are clear and significant differences between Islamic and conventional banks in regards efficiency and risk. A sample of both types of bank across a number of countries was seen as viable in assisting for unobserved time-variant country-specific effects; this therefore provides clearer insight into any and all differences when drawing a contrast with banks from other countries.

Although there is a significant volume of practitioner literature available in regards to Islamic finance, there is a lack of research in specific regards of Islamic banking. In this vein, it has been found by Cihak & Hesse (2010) that smaller Islamic banks demonstrate a greater degree of stability when compared with smaller conventional banks. Moreover, it has been established by Majid *et al*. (2010) that the relative efficiency of Islamic and conventional banks demonstrates much variation when a contrast is drawn across countries. Conversely, it is recognised by Baele *et al*. (2012) that there are lower defaults amongst Islamic loans than conventional loans even when drawing a contrast between the same borrower. On the other hand, it was stated in the work of Ongena & Sendeniz-Yuncu (2011) that Islamic banks operating in Turkey predominantly focus on young, multiple-bank, industry-focused and transparent organisations. Similarly, the study by Khan (2010a) determined that, on the deposit side, when taking a sample of banks operating in Pakistan, Islamic banks were seen to achieve significantly greater growth rates in deposits when compared with conventional banks, with the former even achieving growth during the recent financial crisis in regards higher deposit inflows.

A number of authors have investigated and examined the relative efficiency of conventional and Islamic banks, as in the work of El-Gamal & Hulusi (2005) for Turkish banks and Srairi (2010) for banks in the Gulf Cooperation Council region. The apparent lack of academic work in the field of Islamic finance differs significantly when

considering the fundamental importance and attention now directed towards Islamic banking in a number of Muslim regions in both Africa and Asia. Accordingly, in this thesis, there is the aim of providing a contribution to the volume of literature in this regard. In contrast to other works, emphasis in this thesis is directed towards a number of different elements along which theory states a clear difference between Islamic and conventional banking systems. In contrast to previous papers, much consideration centres on the careful control for omitted variable bias, with a clear prediction made in terms of the performance of Islamic banks throughout the recent financial crisis.

When considering this attempt to explore Islamic banks at the bank level, two fundamental stipulations may be seen to apply: primarily, anecdotal evidence implies key differences across countries in regard the overall structure of Sharī‘ah-compliant products, with a number of banks seen to provide conventional products masked in Sharī‘ah-compliant packaging; this therefore suggests the need to ensure caution whenever interpreting Islamic banking the context of more conventional financial intermediation models. Moreover, there are a number of differences recognised across various Muslim countries in terms of what is recognised as Sharī‘ah-compliant; thus, a cross-country contrast and analysis poses issues.

The financial crisis witnessed in recent years has not only caused concerns in terms of the suitable operation of conventional Western banking, but has further enhanced the emphasis placed on Islamic banking, with some stating that the latter type of bank is superior when facing a crisis (Hasan & Dridi, 2010).

1.1. The Importance of Religion Overall and Islamic Finance in Particular

In recent years, there has been much growth in Islamic finance, although this seems to remain concentrated in a select few regions. Throughout the past years, Islamic finance assets have been seen to grow at double-digit rates, increasing from an estimated USD 200 billion in 2003 through to USD 1.8 trillion by the end of 2013, as noted by Ernst & Young (2014), IFSB (2014) and Wyman (2009). Nonetheless, regardless of such growth, Islamic finance assets continue to be focused in GCC

countries, as well as Malaysia and Iran, and are seen to represent less than 1% of global financial assets.

The growth and development of Islamic Banking, specifically, was seen to demonstrate outperformance when contrasted alongside conventional banking throughout the past ten years. Thus, Islamic banking has increased its scope across a number of different countries, constituting 15% banking system assets share across ten different countries (Iran and Sudan with a comprehensive and mature Islamic financial sector, Bangladesh, Brunei, Kuwait, Malaysia, Qatar, Saudi Arabia, the United Arab Emirates and Yemen) (IFSB, 2014). Importantly, in consideration to global banking assets, Islamic banking is seen to represent roughly 1.25%. Furthermore, throughout the period of the recent global financial crisis, Islamic banks were recognised as less exposed to the toxic assets recognised as sullying the conventional banking world, but nonetheless were seen to suffer from second-round effects, most predominantly through the real estate slump. Capitalisation and asset quality continue to demonstrate better performance when compared with conventional banks, although profitability continues to be lower.

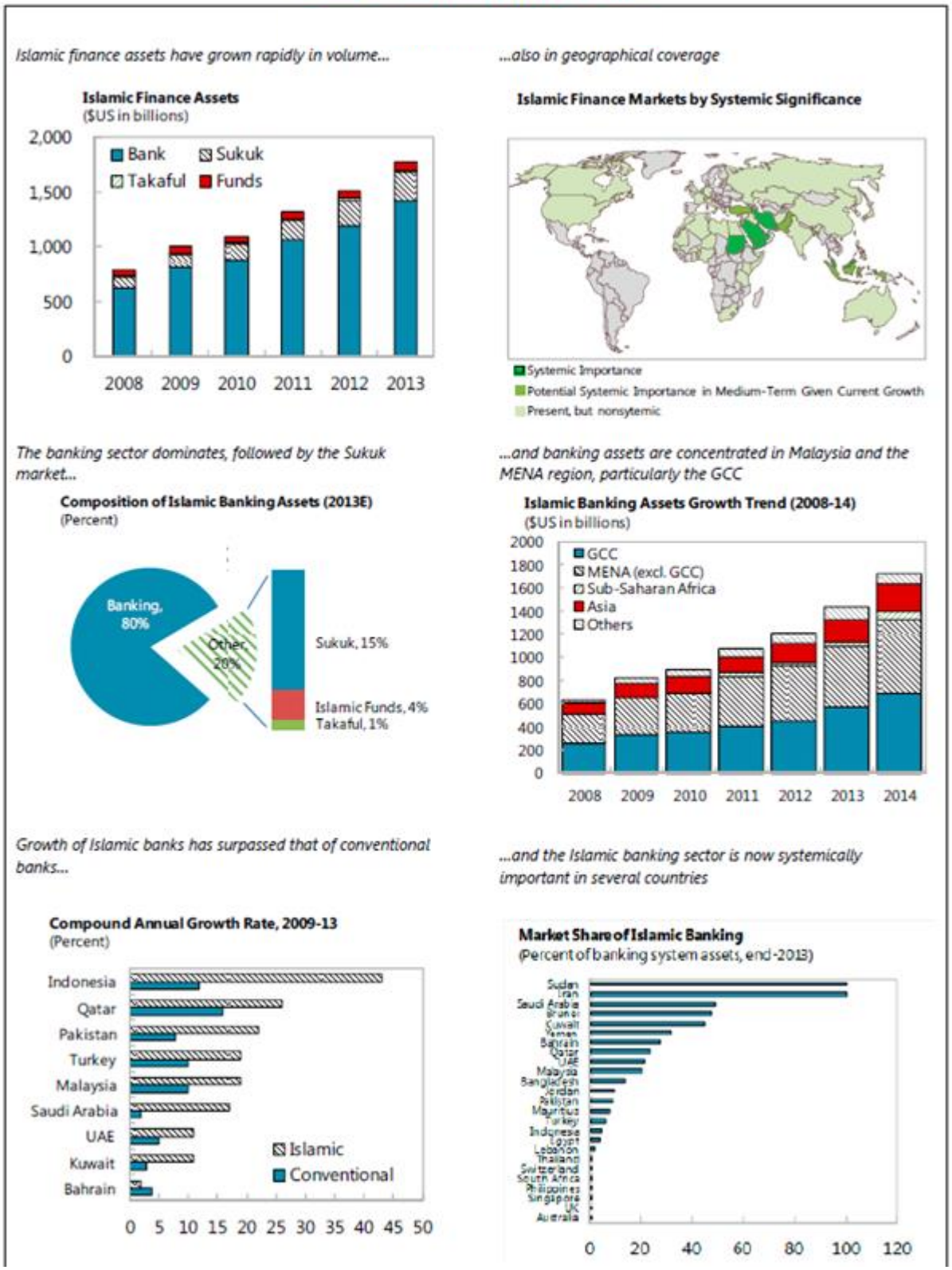

Figure 1. Islamic Finance Assets

Sources: IFSB Annual reports; Central Banks, IFSB; IFIS; Bloomberg; KFHR; and Ernst & Young. Kammer, et al.,(2015) Islamic Finance: Opportunities, Challenges, and Policy Options. Note: GCC= Gulf Cooperation Council; MENA= Middle East and North Africa; UAE= United Arab Emirates; UK= United Kingdom.

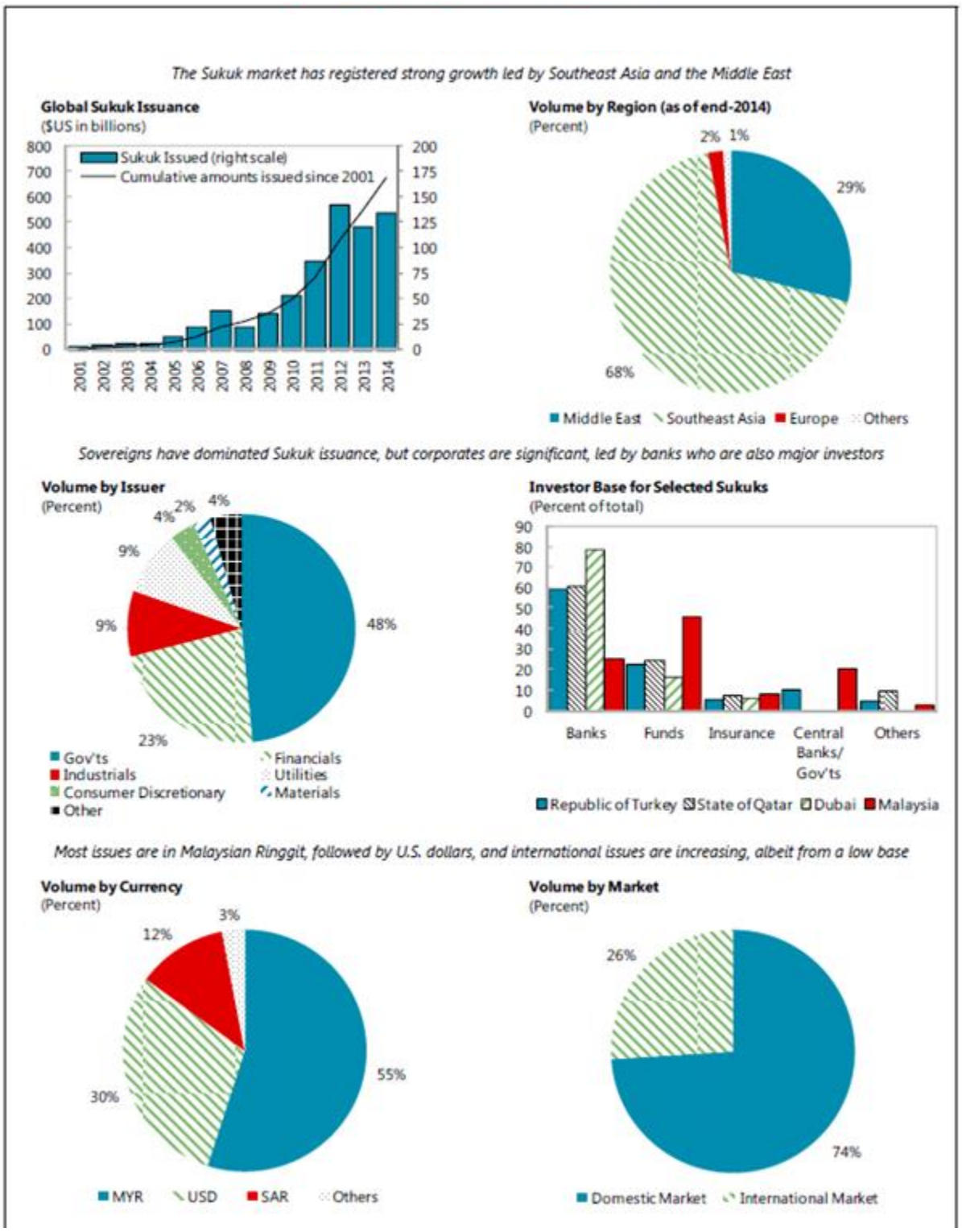

Figure 2.Sukuk Market

Sources: IFSB, HSBC, Kuwait Finance House Research, and Zaywa. Kammer, et al.,(2015) Islamic Finance: Opportunities, Challenges, and Policy Options. Note: MYR=Malaysian Ringgit; SAR= Saudi Arabian Riyal; USD= United States Dollars.

Importantly, when considering Sukuk issuance, there has also been a dramatic increase. On a global scale, issuance has demonstrated much growth since 2006, although notably from a low level. In 2013, levels were seen to reach USD 120 billion, meaning by the end of 2013, outstanding Sukuk was seen to equate to USD 270 billion, thereby representing 0.25% of global bond markets. Importantly, the concentration of issuance can be seen in GCC countries and Malaysia, although diversification is continuous with issuance seen in Africa, Europe and East Asia. Essentially, it is evenly divided between corporate Sukuk and sovereigns, with key domination witnessed in US dollars or Malaysian ringgits. In this vein, demand may be seen to be outweighing supply, which ultimately results in the majority of issuance demonstrating oversubscription, less liquidity with investors showing a preference for purchasing and holding, and lower yields. This can be particularly relevant to Islamic banks, which are seen to suffer from a lack of Sharīʿah-compliant liquid assets.

The significant growth witnessed ultimately highlights the demand demonstrated by Muslim populations, as well as the key economic growth in those regions where there is already an industry centred on Islamic finance. In this vein, such products are also at the focus of innovation in terms of corporate, consumer finance, trade and project elements, as well as improvements in the regulatory environment, strong interest in Sukuk issuance by those banks aiming to improve their capital bases in consideration to Basel III stipulations, and continuous diversification amongst Sukuk issuers seeking to garner savings within and from the Islamic world. Nonetheless, whether or not such development can be maintained in line with more recent oil price decreases remains to be seen when considering the fact that the industry remains focused on oil-exporting countries. Essentially, in this regard, there is the need to complete works and garner empirical evidence in line with oil prices being a determinant of IB diffusion, as recognised in the study of (Imam & Kpodar. 2010) Furthermore, a lack of liquidity alongside low yields could have an impact on the Sukuk market in terms of its long-term growth and development.

Islamic finance is recognised as having the potential to provide significant contributions and more comprehensive growth across the economy. Notable portions of the Muslim population are underservices when considering conventional finance, with only 1 in 4 individuals seen to have a bank account, whilst only 7 in every 100 have access to more formal finance; this is contrasted alongside 2 out of 3 and 1 in

11, respectively, across non-Muslim populations (Demirgüç-Kunt, Klapper & Randall, 2013). Furthermore, when considering risk-sharing and the notable link of credit to collateral, the various principles mean that IB is compatible and well aligned with SME and start-up financing, which therefore contributes to more inclusive and wide-ranging growth. At the same time, Sukuk is recognised as having demonstrated its value in the infrastructure finance field, which can also assist in supporting both economic growth and investment.

In addition, it is recognised that Islamic finance is well positioned to help encourage financial and macroeconomic stability. Risk-sharing and asset-based financing principles can help to encourage better risk management not only by financial entities but also their customers, and can further steer away from credit booms. In this regard, IB may be seen to resemble the proposal outlined in the 1930s within the Chicago plan, which outlines the need to ensure the complete backing of bank loans, with more recent studies implying this could decrease the risk of bank runs and macroeconomic volatility (Benes & Kumhof, 2012; Wolf, 2014). In specific regards Islamic finance, a significant volume of bank deposits are provided on the basis of profit- and loss-sharing Ali, 2011), meaning they are explicitly 'bail-inable' should there be any distress or uncertainty witnessed in the banking sector. Lastly, the ethical precepts underpinning Islamic finance provide, in essence, a fundamental foundation for significant levels of ethical conduct, consumer protection, and sound governance.

Nonetheless, a notable degree of the potential in regards the industry is yet to be utilised, with empirical evidence garnered thus far still not validating whether or not IB has encouraged financial access and depth once consideration has been directed towards structural factors (Barajas, Ben Naceur & Massara, 2015). In addition, a number of questions remain in relation to the degree to which Islamic banks' financing may be viewed as risk-sharing and whether or not PSIAs are absorbing loss in their entirety, suggesting that conventional and Islamic banks might be just as risk-exposed as one another (López-Mejía, Aljabrin, Awad, Norat & Song, 2014).

Importantly, it is recognised that a number of fundamental constraints can be witnessed across Islamic finance that could ultimately hinder its development. Despite the fact that regulatory bodies and standards-setters in the industry have established principles and in-depth technical standards, there remains room for national authorities

to implement such aspects with a greater focus on global conventional banking standards. Furthermore, the lack of academic efforts in the Sharī'ah financing domain, combined with the slow rate of innovation, are critical considerations in the sector, with such challenges not only restricting its development but also potentially encouraging complexity in products and practices, which ultimately go hand-in-hand with risks (Kammer and Norat et al, 2015).

1.2. Islamic Banking

1.2.1. Business Model

Islamic banks are recognised as encompassing significant differences when contrasted alongside conventional banking systems in regards contracts, finance models and investment modes. Such differences can have a notable influence on agency conflicts, corporate governance structures, and accountability as a whole (Abdelsalam et al. 2016).

1.2.2. Finance Model

Islamic banks are recognised as centred on a constrained[3] model of finance, which restricts various activities and components, including Riba (usury), Gharar (excessive uncertainty) and Maysir (speculations), whilst emphasising profit, loss- and risk-sharing. The limitations inherent in the Islamic banking model suggest the presence of two agency cost directions. Primarily, depositors in such banks are seen to adopt the role of Investment Account Holders (IAHs), whilst, in reality, the managers of such banks maintain complete control over depositors' funds and the investments of such. Importantly, amongst IAHs, there is a lack of Board representation, meaning the overall performance of the bank goes unsupervised. The lack of such representation creates a further financial burden, which is shouldered by the depositors. In contrast, however, the need for Islamic banking institutions to ensure alignment with Islamic principles suggests a potential decrease in agency costs through moral accountability limitations at the organisational level. Other studies carried out and documented in the literature suggest that corporate actors, i.e. managers, and their opportunistic behaviours may be somewhat restricted within a setting that actively pursues and adheres to moral values at the business level (Kaptein, 2011; Ha-Brookshire, 2015). Moreover, Islamic banks might also be forced to deal with an additional layer of governance, as outlined by the Shariah

supervisory board[4] (SSB). In this vein, the SSB oversees the compliance of Islamic banks with moral values, and accordingly approves and reports on such. Furthermore, Islamic accountability is a concept that is applied and extended across managers' moral responsibility and that of Board members in Islamic banks, spanning far beyond the legal liability afforded in a conventional context (Beekun & Badawi, 2005; Belal *et al*., 2015).

1.2.3. Governance Model

An SSB is appointment by all banks operating in the Islamic domain, with the SSB functioning as an additional governance mechanism. The main aim of the SSB is centred on ensuring that the way in which Islamic banking institutions function is in line with the Shariah and its principles (Beekun & Badawi, 2005). The presence of such governance is recognised as also able to restrict opportunities for financial mistakes, which ultimately facilitates the moderation of higher agency costs across such banks (Mensah, 2014). In this regard, governance framework of Islamic banks has different actors involved, such as the Board of Directors, management and SSB, interact alongside the key stakeholders, whether creditors, depositors or shareholders. Furthermore, the effects associated with organisational religiosity on agency costs and Islamic banks' reporting behaviours are also detailed (Abdelsalam et al. 2016).

1.2.4. Accountability

Islamic accountability, as a religious concept, further expands on and develops Islamic banks' moral accountability across their main actors, i.e. Board of Directors, management, and members of the SSB, extending beyond legal liability. Such accountability encourages such actors to pursue the bank's wider stakeholders' best interests whilst also focusing on ensuring the values of investments made by depositors and shareholders (IAHs) are maximised and safeguarded (see Beekun & Badawi, 2005; Belal *et al*., 2015). Such actions satisfy the religious stipulations outlined by *Amana* (trust), which necessitates the actors of banking organisations to operate and function in line with *Adl* (justice)-based principles, as well as those underpinning *Qist* (balance) and *Ihsaan* (perfection) (Beekun & Badawi, 2005). Accordingly, there is the commonplace expectation that Islamic banks' management, as actors in such religiously-underpinned entities, conduct themselves in line with assigning the utmost of respect to ethical choices in terms of measuring and reporting on financial transactions. Otherwise stated, a more significant degree of moral accountability limitations imposed upon actors in Islamic banks should, in turn, result in lower agency costs across such organisations. This type and level of accountability is recognised as well-positioned in terms of decreasing if not altogether

eradicating risk-taking behaviours whilst also mitigating earnings management practices. In this regard, a greater degree of transparency and openness is predicted to exist within the banking sector when contrasted alongside more conventional institutions (Abdelsalam et al. 2016).

This work seeks to fill the gap recognised between the three key strands associated with the main literature focused on risk and efficiency, i.e. that measuring these components, investigating the factors underpinning them, and examining the economic consequences stemming from the recent financial crisis in this regard.

Islamic banking is recognised as significantly different when contrasted with conventional banking, with this seen to be the case for various reasons, as discussed above. In addition to such differences, however, there are also variations seen in regards the treasury, with Islamic banks known to be prohibited from almost all regions from implementing various forms of derivatives, including futures and forwards in the foreign exchange arena.

Table 1. Balance sheet comparison between Islamic and Conventional banks

Balance Sheet of an Islamic Financial Institution 1/	Balance Sheet of a Conventional Financial Institution
Assets	**Assets**
Cash and cash equivalents	Cash and cash equivalents
Investment in securities	Investment in securities
Sales Receivables	Loans and advances
Investments in leased assets	Statutory deposits
Investments in real estate	
Equity/Profit-sharing financing	
Investment in Subsidiaries	Investment in Subsidiaries
Fixed assets	Fixed assets
Other assets	Other assets
Liabilities	**Liabilities**
Current Accounts	Current Accounts
	Saving and Time Deposits
Other Liabilities	Other Liabilities
Equity of PSIA	
PSIA (Unrestricted)	
Profit Equalization Reserve	
Investment Risk Reserve	
Owner's Equity	**Owner's Equity**
PSIA (Restricted) [Off-balance Sheet] [letters of credit/guarantees]	Off-balance Sheet [letters of credit/guarantees/derivatives]

Source; Kammer, et al.,(2015) Islamic Finance: Opportunities, Challenges, and Policy Options. Note: PSIA= profit-sharing investment account. 1/ Differences are in red.

When considering the Islamic equivalent of bonds, namely Sukuk, these may be recognised as comparable to asset-backed securities. On the other hand, when reviewing conventional bonds, these are seen to be a promise to repay a loan, whilst Sukuk makes up partial ownership in receivables (*Sukuk al Murabahah*), a construction project (*Istisna'*), a lease (*Ijārah*), a joint partnership (*Mudarabah* or *Musharakah*), a deferred delivery of assets (*Salam*), or investment (*Istithmar*). In essence, overall, the principal amount is not usually guaranteed, with the return acknowledged as associated with underlying assets and the performance of such (Maziad & AlSaeed, 2015). In this way, asset-backed securities may be the form adopted in Sukuk, which could constitute the complete securitisation of underlying assets or which may otherwise be asset-based securities.

From a practical perspective, it is common for Islamic finance to encompass transactions structured in such a way that reflects or replicates conventional finance

in the sense of providing a periodic rate of return. In various Sukuk instruments, it is common for a predetermined rate of return to be paid to the investor, with such a rate centred on the underlying assets' expected return, which collateralise the Sukuk. In specific consideration to debt-like financing, as demonstrated by Islamic banks, there is no interest; rather, periodic, predetermined payments are made by the debtor to the bank, in line with the profit to be expected stemming from the use of the underlying asset. This can result in slight variations in substance with conventional finance models, with some instances warranting a more complicated transactional layering with the inclusion of third parties. In some situations, these could generate various risks, including operational, that would ultimately require sound management (Beck, Demirgüç-Kunt & Merrouche, 2010; Čihák & Hesse, 2008; Chong & Liu, 2009; Ali, 2011; Kammer and Norat *et al.*, 2015).

Importantly, Islamic banks are seen to be vulnerable to various risks that can cause obstacles for regulatory and legal models, as noted below:

- Displaced commercial risk may be relevant when Islamic banks are competing with more traditional banking systems, with such competition meaning Islamic banks and their shareholders could be required to sacrifice some of their profit in order to avoid losses for investment account holders, for example. This can result in issues in the way in which Islamic banks build reserves against losses and the way in which they are treated when establishing regulatory capital.
- Equity investment risk could be a problem owing to the banks' assets comprising physical investments when returns are uncertain. In this regard, depositor flight could also surface should market interest rates increase beyond the rate of return able to be funding by the assets of the banks.
- *Shari'ah* governance and compliance requirements could mean non-compliance could induce trigger flight.
- Operational and market risks might increase owing to the complexity of products and the lack of hedging tools.
- The sale of debts and the charging of interest when default occurs could mean increased credit risk, as also demonstrated by non-performing loans and profit-and-loss-sharing initiatives.
- *Shari'ah*-compliant liquidity tools and infrastructure shortages could also mean liquidity risk is heightened.

In regards IB's individual characteristics, these have been considered through specialised Islamic standard-setting institutions, with conventional standards applicable across all banking systems, but with the incorporation of special standards for IB. The sector is known to encompass two individual standard setters, namely the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), established in 1990, for *Shari'ah* accounting and auditing standards, as well as the 2002-established IFSB centred on regulatory and supervisory standards. Such bodies have devised a number of guidance notes and technical standards, working in alignment with the Basel Committee and comparable conventional standard-setting bodies so as to ensure consistency with and adherence to their standards. Nonetheless, it remains that the adoption of such standards across different countries is not uniform, with only 8 countries out of 29 examined seen to apply AAOIFI accounting standards (IMF) (Kammer and Norat *et al.*, 2015).

A survey was carried out in 2011 centred on models governing IB practice. The main findings are seen to be important when considering that the supervisory and regulatory models have not witnessed much change. All IMF members with a degree of IB presence were contacted, with 39 countries responding, with ten not considering IB. The key findings of the survey can be summed up as follows:

- A total of 72% of the respondents suggested that the regulatory and legal model acknowledges IB institutions, products and/or practices, with a total of 76% of the respondents recognising IB as carried out individually and 55% holding the view that IB is carried out through a conventional bank.
- A number of the respondents stated that all banks were required to adhere to a single integrated regulatory framework, with 3 recognising two separate independent regulatory frameworks, whilst 7 respondents made reference to the presence of a combined approach; notably a comparable regulatory model applicable to both conventional and Islamic banks, but with separate guidelines and regulations for areas specific to IB.
- In specific regions, the Basel capital model is applicable across all banks, including IB, with other regions adopting regulatory capital adequacy requirements, which contain prescriptions that are commonly based on IFSB prudential standards and guided principles on the necessary adjustments to the Basel capital framework in mind of dealing with particular IB features. As

such, there may be difficulties in drawing a contrast with capital ratio in line with Islamic banks of varying countries.

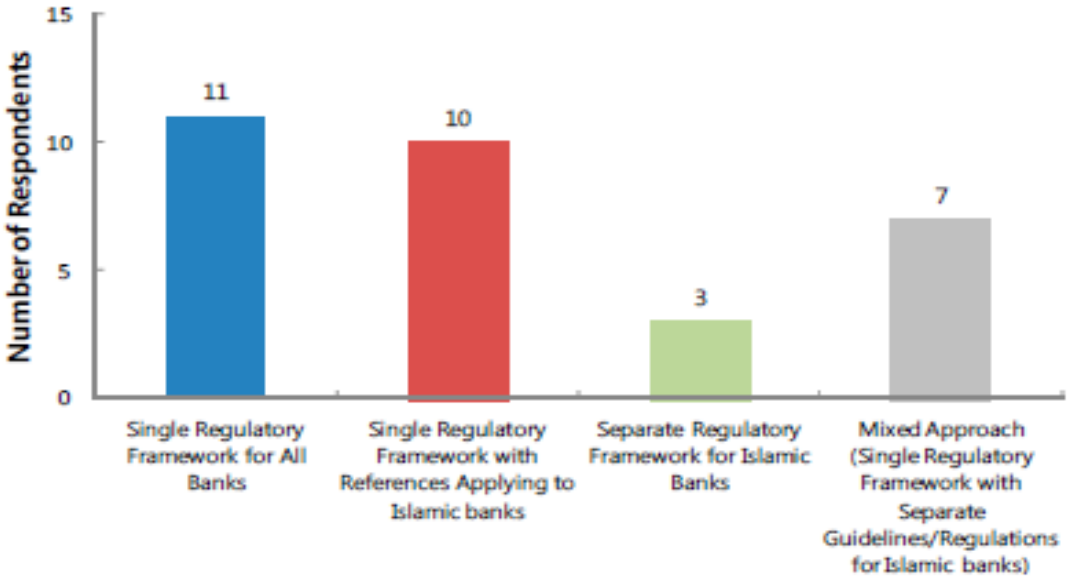

Figure 3. Regulatory Frameworks

Source: Kammer, et al.,(2015) Islamic Finance: Opportunities, Challenges, and Policy Options.

- Two supervision models in regards IB are applied in jurisdictions where IB and conventional banks both operate, as shown in Figure 4. In the first model, conventional and Islamic banks are required to function in line with a single supervisory authority, whereas in the second model, there is the separation of Islamic and conventional banks within an individual supervisory authority.
- Varying approaches are seen from one jurisdiction to the next in regards the nature and degree of data needing to be disclosed, as outlined by banks. In those with conventional and Islamic banking institutions, the disclosure requirements remain the same, whereas in other regions, financial statements pertaining to an IB cannot be made public unless this has been approved by the *Shari'ah* board.
- When comparing jurisdictions in regards protection through deposit safety nets and investments with IBs, there is much heterogeneity witnessed. Protection varies from no coverage of investments and deposits through to complete protection. In some instances, there is a single-deposit protection facility

whereas others have separate schemes for conventional and Islamic banks, respectively.

- Practices differ from one country to the next. Importantly, the distress resolution process for Islamic banks does not differ when compared with that of conventional banking institutions. In relation to the enforcement and corrective actions and processes model, in most instances, there are no differences between the conventional and Islamic banking systems.

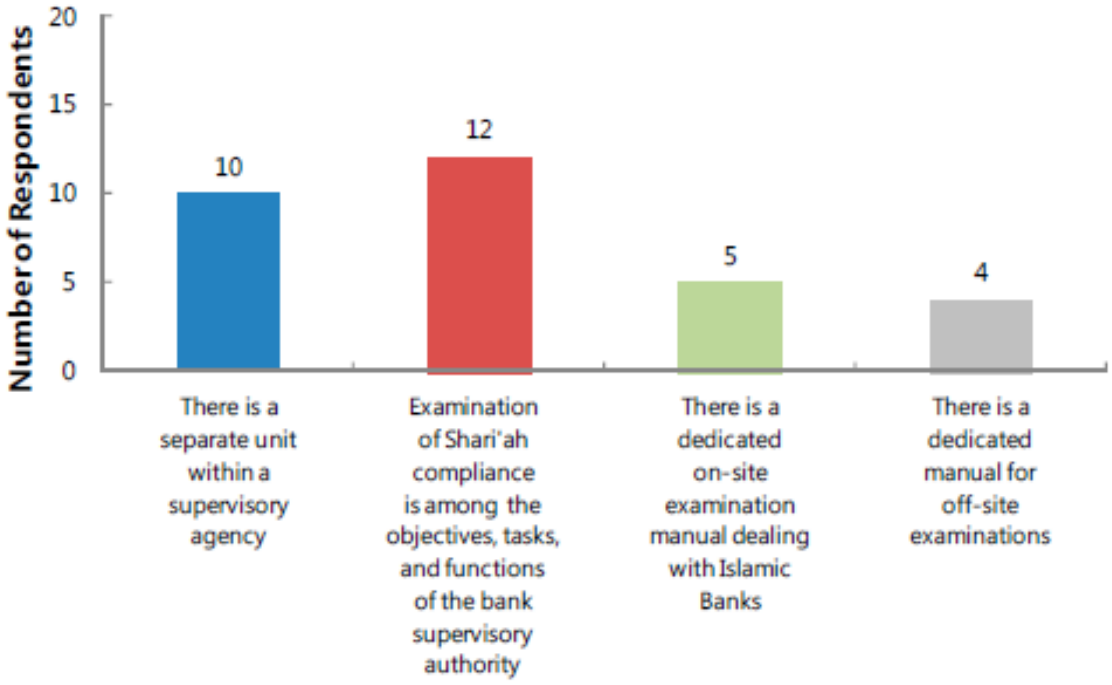

Figure 4. Islamic Banks Examinations

Source: Kammer, et al.,(2015) Islamic Finance: Opportunities, Challenges, and Policy Options.

As is the case of conventional finance, the supervisory role of Islamic finance may be recognised in various ways, although the main emphasis is placed on ensuring the satisfaction of various aims and objectives. These might include the presence of a sound legal framework, sound accountability practices and a well-designed governance framework (Viñals *et al*., 2010). Nonetheless, in various jurisdictions, there appears to be a shortage of focused examination and licensing procedures for IB. Moreover, in Islamic banks, supervisors do not appear to be positioned to

supervise both the mutual fund-type activities undertaken by IBs and the banking as a whole, which necessitates a cross-sectoral approach spanning banking, securities and insurance. Such complexities further highlight the value of national authorities adopting the Core Principles for Islamic Finance Regulation (banking segment); these will soon be issued by the IFSB and are known to be centred on the core principles of the Basel Committee on Banking Supervision (BCBS). Also of value are FSIs (financial soundness indicators) for IBs, with the IFSB known to be auctioning various processes in order to devise and expand structural indicators for Islamic finance, in line with the FSIs of the IMF.

One of the key obstacles is a sound, robust regulatory treatment of Islamic banks' PSIA. Despite the fact that these accounts are seen to replicate the shares of a mutual fund, at least in functional terms, only a small number of countries facilitate some degree of pass-through of losses on the assets finances when calculating the CAR (capital adequacy ratio), which notably is seen to vary by as much as 70%. Furthermore, and somewhat as a result, the PSIAs have encouraged banks to ensure greater liquidity buffers and higher reserves. In the future, regulatory and supervisory authorities need to ensure PSIAs are not handled in the same way as pure deposit, but rather ensure the IFSB guidance is observed when setting the alpha factor so as to ensure their loss-absorbency feature is not undermined.

Another key issue is recognised in regards IAHs sharing profits and shouldering losses, although there is a pronounced lack of shareholder rights, as noted by (López-Mejía *et al*., 2014). Accordingly, it might not be possible for IAHs to secure complete disclosure in regards assets performance or in terms of the way in which PSIA is calculated in terms of the rate of return. Furthermore, whenever withdrawals are made, it might not be possible to recover contribution to buffers used in order to protect capital and smooth returns. In an effort to overcome this challenge, corporate governance could be improved, such as through requiring Board directors to be held accountable in regards the implementation of IAHs' rights. In this regard, there is a need for complete transparency and disclosure to be recognised by supervisors in relation to assets, payouts and reserves performance.

Another challenge facing IB is that of compliance with *Shari'ah*, with regulators not always having the ability to ensure banks are adopting sound practices. Furthermore,

there are variations in the way in which *Shari'ah* may be interpreted, which can result in a lack of alignment between and across borders; this could have an impact on trust within the sector. It is therefore suggested that, at the bank level, an independent *Shari'ah* Supervisory Board (SSB) be established for the completion of reviews. It is further noted that a centralised Board, in this regard, could be beneficial in terms of ensuring consistency in approaches. In addition, standardised approaches to policies could be implemented, with suitable accounting standards needing to be followed.

Basel III application amongst Islamic banks is also recognised as posing a number of challenges, with Islamic banks already seen to be well-capitalised. One problem remains, however, with regards risk-weighted assets when considering variation across regions in the way in which PSIAs are treated, as included in capital, according to an alpha factor that differs from one region to the next. This highlights the value of efforts directed towards ensuring a greater degree of consistency in relation to the alpha factor where there is similarity in the levels of displaced commercial risk and RWAs.

There is a tendency for high levels of liquidity to be witnessed amongst Islamic banks, although they are known to suffer from a shortage of well-developed markets for high-quality liquid assets that are *Shari'ah*-compliant. Importantly, this then necessitates that a greater volume of cash needs to be held by Islamic banks, which in turn has an effect on their profitability, with the lack of such deposit insurance potentially heightening the need for there to be excess liquidity held, meaning greater run-off factors on deposits and PSIAs are demonstrated by Islamic banks, with the recommended run-off factors exceeded. Importantly, liquidity risk could be reduced through decreasing the length of financing maturity, with improved maturity aligned with their liabilities. To some degree, this issue could be minimised through improving the supply of tradable and well-rated Islamic securities.

Risk-based supervision across Islamic banking remains under-developed in a number of countries, with the need in a number of instances to establish particular instruments required in order to ensure such supervision, as well as the methodologies to evaluate their unique risks and vulnerabilities. As an example, when evaluating asset quality, there are many differences, with vulnerability to market risk, greater operational risks and *Shari'ah* governance not consistently applied and present in the risk-based

supervision methodologies. In this regard, there is a need for the application of rating methodologies and the IFSB standard on stress testing.

Importantly, there are particular protection-related issues that could cause problems in the Islamic banking arena. As an example, some contracts, including *Ijārah Muntahia Bittamlīk* or 'lease-to-purchase', means consumers could be in an undesirable position. Those customers who demonstrate defaults prior to reaching the conclusion of their contract term could suffer equity losses, meaning they are unable to take advantage of capital gains when seeking to prepay a mortgage. The issues inherent in various Islamic bank contracts also mean that there are problems in consumers garnering complete understanding into the risks. Moreover, banks' corporate structure can sometimes mean conflicts across group interests and in terms of the fiduciary responsibilities of the Islamic bank. Accordingly, it might not be possible for IAHs to achieve the best returns whilst also bearing loss risks. As such, there is a need for a consumer protection model to be devised and implemented with the aim of catering to the particular character of Islamic finance, ensuring strong supervision of parties' financing, and improved financial literacy, along with improved insolvency and bankruptcy schemes (Lukonga, 2015; Kammer and Norat *et al.*, 2015).

1.3. Financial Crisis

The factors underpinning the occurrence of the financial crisis are examined in regards worldwide structural imbalances (Jagannathan, Kapoor & Schaumburg, 2013), attention directed towards behavioural factors (Mortreul, 2010; Ashby, 2010; Moshirian, 2011), factors establishing the overall scale and severity (Claessens, Kose, 2013; Stiglitz, 2010), regulatory considerations (Moshirian, 2011; Kane, 2012; Imbierowicz & Rauch, 2014), and inadequacies in banking (Claessens, Demirguc-Kunt & Moshirian, 2009; Jickling, 2009; Sakbani, 2010; Stiglitz, 2010; BIS, 2010b; Gonzalez-Paramo, 2011a, b; Vermorken, 2011; Firtescu, 2012; Cabal, 2013). Accordingly, much attention has been directed towards establishing the factors responsible for the financial crisis, despite the examination of credit risk management and changes being somewhat lacking, particularly in the context of its adoption in a certain region.

A financial crisis may be defined as the economic situation associated with banking panic, which may be seen to encompass financial sector losses, significant production, and stresses induced on international markets, causing downfalls in the stock market, increases in currency, foreign loans, financial bubbles, and a significant downfall in economic activity, all of which is positioned to cause recession (Racickas, Vasiliauskaite, 2010). Importantly, at a particular level, crises may be seen as significant manifestations of the interactions between the real economy and the financial sector (Claessens, Kose, 2013). Prior to the 2008 crisis, crises were recognised as significant growth in the financial industry, when financial institutions' sizes and the number of financial transactions carried out are seen to surpass what could feasibly be recognised as economically or socially optimal (Kapoor, 2010). However, there has been much change witnessed in the financial markets, as well as across markets and associated incentives: finance was recognised as centred on the short-term, which ultimately became destabilising, causing the scope and speed of contagion within the system to increase, a lesser degree of transparency in the financial system, and high uncovered leverage and opacity on an international scale, along with price inflation through low interest rates (Kapoor, 2010; Ashby, 2010). In this particular setting, market disturbances or shockwaves can cause a number of detrimental effects, including a stop in transactions, low levels of confidence, and cross-border effects. Accordingly, the recent financial crisis can cause a number of different outcomes and an impact felt across the world.

The financial crisis started in 2007, with 2008 witnessing momentum. The first stage of the crisis, which spanned July 2007–August 2008, was explained as the onset of the American mortgage crisis, which had witnessed significant write-downs by banks owing to bad mortgages, with bankruptcies witnessed after. The second stage began in September 2008, when the liquidity crisis began; this witnessed banks, specifically, coming to experience unparalleled liquidity stress, consequently affecting their capacity to lend. The subsequent stage stemmed from the liquidity crisis, which caused access to credit to be frozen for banks, businesses and households, therefore causing shocks to economic activity and a lack of trust across the banking system as a whole (Grigor'ev, Salikhov, 2008). The various phases inherent in the financial crisis can be viewed differently by professionals in the domain: as an example, Sakbani

(2010) emphasises the need to consider the actions of central banks and the imbalances in international payments.

Importantly, the crisis was recognised as extreme destruction, and was predicted at equating to approximately US$ 50 trillion—notably on the same level as one year's world GDP (Aisen, Franken, 2010). Furthermore, it has been acknowledged as the worst crisis to have been witnessed since the Wall Street Crash of the 1920s and the Great Depression of the 1930s (Ashby, 2010), with some even viewing it as the most significant crisis across finance capitalism's history (Turner, 2009). The financial crisis, which spanned 2007–2009, has been linked with a decline in values across bonds, stocks, property and other assets, with the crisis teaching a significant lesson in regards the various dimensions of a crisis (Claessens, Kose, 2013). Furthermore, across a global scale and in terms of its impact, the crisis was unprecedented, with issues exported through a variety of different channels, including commerce, currencies, derivatives and investments, into other countries (Stiglitz, 2010; Moshirian, 2011).

The USA is known to have been the originating country in the financial crisis, with the failure of a number of well-known banks witnessed. The spread of the crisis was significant at the global level as a result of economic interlinkages and integration. As has been stated by Dovern & Roye (2014), the majority of all advanced and emerging world economies felt the impacts of the crisis. As noted by Ioan & Maria (2009), the crisis could be compared to a tsunami, which affected almost every country in the world. The growth witnessed by many countries quickly fell into decline both during and following the crisis, with stock markets demonstrating volatility, subsequently affecting investor confidence. The severity of the crisis was wide-ranging, and caused a number of concerns in regards the world's overall economic stability (Spence, 2009). In this vein, it is important to recognise that no country escaped unscathed.

The crisis was seen to spread across all financial markets, including Europe and the rest of the world. The crisis demonstrated transmission through both direct and indirect channels, with progression seen to develop quickly owing to the financial systems of the world being integrated through the US (Frenkel & Rapetti, 2009). Importantly, the worldwide integration of the financial systems caused the crisis to demonstrate expedited growth (Chava & Purnanandam, 2011; Raz, Indra, Artikasih & Citra, 2012),

with the integration impacting the economies through a crash in domestic liquidity, reduced overseas financing for organisations, and lowering stock prices (Siddiqui, 2009). Importantly, the crisis's effects were seen across the world, although there was variation in this regard, with more emerging economies demonstrating more pronounced effects (Fraga & Rocha, 2014; Bhattarai, 2015). Furthermore, those countries with greater economic freedom and greater dependence on the financial sector were seen to be more exposed (Shostya, 2014), whilst in advanced economies it was transmitted and appeared immediately (Claessens, Kose & Terrones, 2010).

Pakistan for instance as a country was recognised as feeling the effects of the crisis, with the present work seeing to observe the phenomenon from an empirical standpoint. The country's subsequent circumstances are analysed in consideration to the aspects of efficiency and financial performance, with the efficiency analysis carried out through a completion of data envelopment analysis; in terms of observing the impacts of the crisis on the financial performance of commercial banks in the country, a panel regression model was implemented. His findings suggest that the banking sector in Pakistan was not affected by the global financial crisis either in terms of efficiency or performance.

A negative effect stemming from banking performance was witnessed across many countries as a result of the credit crunch and subsequent liquidity issues. The confidence of investors was knocked, with a number of concerns raised in regards financial and economic systems' stability across the globe (Spence, 2009). In this regard, a suitable explanation for the occurrence can be provided by the bank run theory, which addresses a number of pessimistic expectations of depositors in regards future economic stability during periods of economic decline. This can encourage them to immediately withdraw cash, thus causing liquidity issues across the banking system as a whole. In an effort to satisfy liquidity requirements, banks may need to trade their assets—even if this incurs further loss (Diamond & Dybvig, 1983). Accordingly, the bank run theory is recognised as being amongst the most critical characteristics of the severe economic crises—and thus is a base of real economic problems. Throughout the great depression, economic issues were also developed mainly through bank runs (Diamond & Dybvig, 1983; Gorton, 1988). Moreover, the banks were unable to satisfy lenders' financing requirements as a result of the shortage of funds available in this regard. This can also result in bankruptcy, economic recession and insolvency, with

Fisher (1933) further recognising the key role to be adopted by debt in economic expansion and depression.

Across the banking sector, performance and efficiency were seen to decline during periods of financial crisis, with the phenomenon the focus of empirical investigation by researchers. In one of these works, Anayiotos, Toroyan & Vamvakidis (2010) detailed banking sector decline efficiency in emerging European economies throughout periods of crisis. Through the adoption of the ration analysis, a decline was witnessed across various aspects, including credit quality, liquidity and profitability in the case of South African banks during the financial crisis (Kumbirai & Webb, 2010). The notable difference of crisis to pre-crisis patterns was, however, only recognised in regards profitability-related indicators. A negative but notable impact on profitability in the banking sector was also established in the study of Dietrich & Wanzenried (2011) in the context of Switzerland, with state-owned banks' performance seeming better when compared with those owned by private investors. In addition, other works also documented the significant negative effects stemming from the crisis in terms of financial performance and efficiency across banks in Jordan (Zeitun & Benjelloun, 2012; Al Qudah & Malkawi, 2014). Furthermore, in the Indian context, Singh & Makkar (2014) came to recognise a significant impact of global financial crisis on the volatility of stocks on the banking sector. Moreover, an overall decline in efficiency was recognised across European banks following the crisis, as detailed by Matousek, Rughoo, Sarantis & Assaf (2015), with comparable effects seen in financial firms in the US in the work of Hippler & Hassan (2015). Another work also noted a negative effect on pure and scale technical efficiency in Australian banks (Moradi-Motlagh & Babacan, 2015).

1.4. Research Aims and Objectives

The main aims of this thesis are to provide a broad analysis on the research contributions, recognized as exploring Risk and Efficiency in the banking sector. Risk by itself is a vital aspect in the financial system and efficiency from the other angel is also a very important aspect in the financial system. Therefore, in order to provide a

solid investigation on banking risk and efficiency. First, will investigate the variables affecting bank risk in the allocated study area. Second, will look at the variables that impact the efficiency levels in the specified area. Finally, and after observing results on the variables affecting the two main study aspects (Risk and Efficiency). It is also important to take a comprehensive look at all parts – Islamic & Conventional - of the banking sector. Unlike most previous studies, the aim of this research is concerned with examining these issues in both Islamic and conventional banking systems in order to deliver a more comprehensive research. Furthermore, when including Islamic banking, it is needed to consider the countries in which such types of banks perform the most in order to achieve the most accurate results.

Objectives are as follows:

First, to examine the variables affecting risk in banking systems in the MENA area. Banking systems have different financial and market aspects which would in one way or another have an impact on banking risk.

Second, to witness the variables affecting efficiency in banking systems in the MENA area. Efficiency, just as risk is another banking aspect which could be affected by different financial and market aspects.

Third, to compare risk and efficiency levels between Islamic and conventional banks in the MENA area. As Islamic differs from conventional banks, the two different systems are expected to vary in terms of risk and efficiency.

Fourth, to observe the financial crisis impact on risk and efficiency levels in both Islamic and conventional banks in the MENA area. As financial crisis has impacted all banking systems, elements like risk and efficiency are expected to be impacted.

1.5. Research Contribution

This PhD builds on the existing theoretical and empirical literature on efficiency and risk in banking in the following ways:

- The study investigates and analyses the statistical outcomes – using the proposed methodology- in both Islamic and conventional banking systems, which should allow a better and clearer angle of the analysis providing such a

comparative study. Simply by comparing the two financial elements' outcomes (Islamic and Conventional).

- Since Islamic finance derived its rules and regulations from Islamic Sharī'ah' law, these rules and regulations have many differences when compared with conventional finance. This of course will make the banking system platforms different in the following ways:

  (a) The working systems will be different from conventional to Islamic which means different banking inputs' to be taken.

  (b) As a result of these major differences in inputs, the outputs will eventually be different. Efficiency levels and risk levels should differ from conventional to Islamic banking systems.

- The study examines risk in three different variables, assuming two types of risks (Credit and Insolvency) compared with one or two proxies used in previous studies; this of course, increases the level of accuracy in such an important manner of the research, which will also impact the overall results and outcomes.

- The period of time covered is a crucial aspect in terms of providing adequate time for reliable results. By covering a ten-year period spanning 2006–2015, the results should cover comprehensive financial changes.

- The period of time covered is also crucial simply because it covers the recent global financial crisis and its impact on the financial sector all over the world.

- Geographically, the analysis will be more diverse than previous studies because it covers the main countries dealing with both Islamic and Conventional banking systems at the same time. And this should provide a much wider look at the issues investigated. The geographic factor is essential, because these mentioned research gaps include coverage of the MENA countries which are (Saudi Arabia, Kuwait, Qatar, Bahrain, United Arab Emirates, Jordan, Turkey, Egypt, Tunisia and Sudan).

The remainder of thesis is structured as follows. Section 2 presents some of the previous theoretical and empirical literature. Section 3 presents data and methodology. Section 4 presents models' analysis. Section 5 compares and discusses the models' results and findings. Finally, Section 6 concludes the thesis with key findings, contributions, limitations and suggestions for future research.

2. Literature Review

2.1. Introduction

In recent years, the worldwide banking industry has experienced significant change as a result of the advent of alternative profit-based financial systems. In the GCC (Gulf Cooperation Council), SEA (South East Asia) and a number of European countries, Islamic finance has become a fundamental element in the economic development agenda, and rapidly is establishing a position in the world's financial arena. The business is growing also as a result of its ability to cater to people's financial needs without causing problems surrounding their religious and social beliefs and values.

Throughout the past twenty years—notably before the onset of the late-2007 financial crisis—there began the integration of European banking markets. Technological change combined with deregulation contributed to the progressive process of financial integration, and subsequently caused increases in competition to be witnessed in the financial field (Goddard *et al*., 2007). Accordingly, much importance has been attributed to improved efficiency in the banking field; in other words, banks have been forced to satisfy efficient production and adhere to best practice to the greatest possible degree. Similarly, such an increase in competition could, in the short-term as a minimum, result in potentially excessive risk-taking as a result of increased competition, which subsequently decreases banks' market power and, as a result, their charter value.

The literature review for this thesis looks at the theoretical and empirical evidence on the relationship between efficiency and risk. This section will be divided into different parts. Starting with the theoretical literature and then moving onto the empirical literature. Finally, the review will address the nature of "Islamic Finance" and the impact that it can have on both efficiency and risk on the financial systems operating under Islamic rules and regulations.

2.1.1. Banking Risk

According to (Apostolik, Donohue and Went, 2009), banks face several types of risk. All the following are examples of the various risks banks encounter:

• Borrowers may submit payments late or fail altogether to make payments.

• Depositors may demand the return of their money at a faster rate than the bank has reserved for.

• Market interest rates may change and hurt the value of a bank's loans.

• Investments made by the bank in securities or private companies may lose value.

• Human input errors or fraud in computer systems can lead to losses.

To monitor, manage, and measure these risks, banks are actively engaged in risk management. In a bank, the risk management function contributes to the management of the risks a bank faces by continuously measuring the risk of its current portfolio of assets and other exposures, communicating the risk profile of the bank to other bank functions and by taking steps either directly or in collaboration with other bank functions to reduce the possibility of loss or to mitigate the size of the potential loss (Apostolik, Donohue and Went, 2009).

From a regulatory perspective, the size and risk of a bank's assets are the most important determinants of how much regulatory reserve capital the bank is required to hold. A bank with high-risk assets faces the possibility that those assets could quickly lose value. If the market—depositors—perceives that the bank is unstable and deposits are in peril, then nervous depositors may withdraw their funds from the bank. If too many depositors want to withdraw their funds at the same time, then fear that the bank will run out of money could break out. And when there is a widespread withdrawal of money from a bank, the bank may be forced to sell its assets under pressure. To avoid this, regulators would want a bank with high risk assets to have more reserves available. Therefore, understanding banking regulation requires understanding financial risk management.

There are many kinds of risk a bank may encounter. The risks debated below are those recognised by the Basel Accords, the cornerstone of international risk-based banking regulation. The Basel Accords, are the result of a cooperative attempt by banking regulators from major developed countries to create a worldwide valid and widely applicable framework for banks and bank risk management (Apostolik, Donohue and Went, 2009).

The Basel Accord, concentrates on three types of risk:

1. Credit risk

2. Market risk

3. Operational risk

The Basel Accord also identifies that there are other kinds of risk that may include these different core risk types (see Figure below)

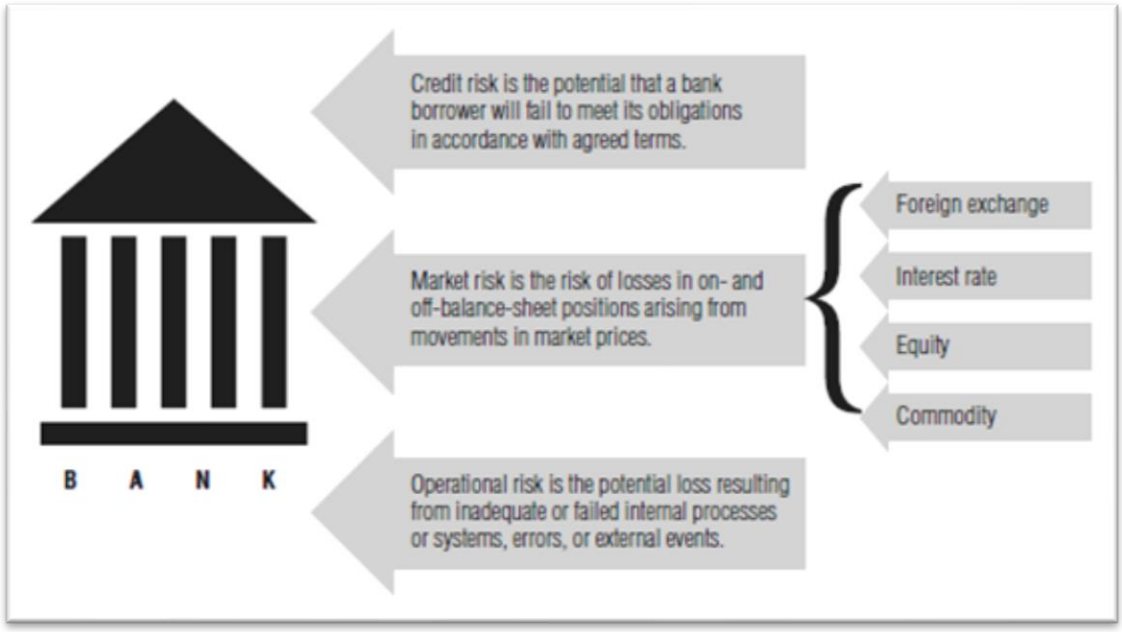

Figure 5. Banking Risk

Source; (Apostolik, Donohue and Went, 2009).

2.1.1.1. Credit risk

Credit risk is the possible loss a bank would suffer if a bank borrower fails to meet its obligations—pay interest on the loan and repay the amount borrowed—in accordance with agreed terms. Credit risk is the single largest risk most banks face and arises from the possibility that loans or bonds held by a bank will not be repaid either partially or fully. Credit risk is often synonymous with default risk (Apostolik, Donohue and Went, 2009).

2.1.1.2. Market risk

Market risk is the risk of losses to the bank rising from activities in market prices as a result of changes in interest rates, foreign exchange rates, equity and commodity

prices (Apostolik, Donohue and Went, 2009). The components of market risk are as follows:

- Interest rate risk.
- Equity risk.
- Foreign exchange risk.
- Commodity risk.

2.1.1.3. Other Risk Types

Beyond the three main kinds of risk—credit, market, and operational—there are other risks banks meet and must manage properly. These risks include: Liquidity risk, Business risk and Reputational risk (Apostolik, Donohue and Went, 2009).

2.1.2. Efficiency

Efficiency, as a concept, is now receiving much more interest in the economic literature, and may be recognised as the ratio of output–input in any system. It further centres on the overall measure of diligence, as shown in the course of performing a particular task. Essentially, this implies the ability to circumvent or at least reduce waste without decreasing the output expected in this regard.

Banking sector efficiency is regarded as a fundamental aspect assisting in the fruition of a productive financial industry. One of the key factors underpinning the establishment of banks was the need to enable intermediation through redirecting funds from the surplus sector to the deficit sector of the economy. This focus is seen to surpass banks' soundness, but rather encompasses banks in providing credit for much-needed growth. In the view of Ikhide (2009), a banking system's overall soundness, strength and solvency are relevant to the performance of the economy as a whole. Without a well-functioning banking system, the ability of the economy to function is lacking. As a result of such reasons, amongst others, much emphasis is placed on the operational efficiency of banks. When a country opens its door to international trade, much faster growth is experienced. This adopts the assumption that export-led growth can achieve financial and industrial development (Stiglitz, 2002), with such a factor recognised as significantly influential in the growth of Asia, which has been seen to enhance the population's standard of living. Importantly, such

a position is seen to starkly go against that of Africa, which accordingly highlights the need to examine the efficiency of the banking sector in the way in which their role is carried out (Oluitan, 2014).

Inefficiencies in banks are, importantly, recognised as an intrinsic factor. In the view of Turati (2003), 'banks are regarded as firms that emerge as a result of some sort of market imperfections; hence they bring about a certain degree of inefficiency with respect to perfect competitive outcomes'. A work was carried out by the European commission (2001), as recognised by Turati (2003) provided support to the aforementioned thought when showing that European banks were seen to be especially inefficient. In this regard, the efficiency of banks is fundamental at both micro and macro levels and in order to assign resources effectively, banks should be sound and efficient (Hussein, 2000).

In banking, efficiency may be differentiated between technical and allocative efficiency, with the latter seen to relate to the degree to which resources are assigned to the use with the highest value. A firm is seen to be efficient if it produces a particular set of outputs using the smallest possible volume of inputs (Falkena *et al*., 2004). In this vein, outputs may be seen to be a total balance of deposits or loans, whereas inputs might include capital, labour and other operating costs. Furthermore, a firm is recognised as cost-efficiency should it be technically and allocatively efficient, as noted by Mester (1997). Various works centred on X-inefficiency—which may be seen to be a measure of the loss of technical and allocative efficiency—have been conducted on an international scale, with the findings showing X-inefficiency as falling between 20% and 30% of all banking costs in the US (Berger & Mester, 1997). In the view of Falkena *et al*. (2004), X-inefficiency, as a concept, implies that comfortable incumbents might not be able to be repeated in the most efficient approach. Should there be only a few parties dominating the market, this might mean they are sheltered from competitive forces and therefore could use rule-of-thumb as opposed to implementing best practice approaches.

A number of different works have sought to examine overall efficiency in banking, especially through the use of non-parametric and parametric approaches. Nonetheless, very few works have examined bank efficiency determinants.

The ability of banks to demonstrate efficient performance, i.e. to secure accurate information in regard to the financial prospects of customers and accordingly to write and implement effective contracts, essentially depends on the contracting, legal and regulatory environments in which they operate, as well as the property rights. Such an environment is seen to include accounting practices, chartering rules, government regulations and market conditions (e.g. market power) under which banks operate (Hughes & Mester, 2008).

According to Hughes & Mester (2008), these features demonstrate differences across a number of facets, including political jurisdictions, which can, in turn, result in differences in bank efficiency on the basis of jurisdictions. Moreover, the internal and external mechanisms disciplining bank managers can also be affected by the operating environment, where internal discipline could be reduced or encouraged through capital structure, governing boards, managerial compensation or organisational form.

In the work of Altunbas *et al*. (2001), which centred on banking institutions operating in the German context, it was established that public and mutual banks demonstrate slight profit and cost efficiency advantages when compared with those entities operating in the private commercial domain, which is described by the scholars as owing to their lower fund costs. The aforementioned literature, however, does not provide adequate assistance in terms of establishing whether or not efficiency differences between the different types of bank have any degree of influence on their risk profile or capital strength. The aims pursued in this study seek to address such issues.

In a research centred on the risk vulnerability of large domestic banks based in the US, it was established by Linbo Fan (2004) that profit efficiency is vulnerable to credit risk, although notably not to insolvency risk not to the combination of loan products. In this vein, the point is posited by Hahm (2004) that there is a need for banking supervision, alongside the risk management of banks, to be improved so as to ensure financial liberalisation is successful. This is based on a work carried out in regards interest rate and exchange rate exposure in the context of banks in Korea prior to the 1997 Asia Pacific economic crisis, which established that commercial banks'

performance was notably linked with their pre-crisis risk exposure (Abd Karim et al., 2010).

2.1.3. Financial Crisis

There are a number of different perspectives to be adopted in regards the causes of the crisis, including US monetary policy, extreme elasticity in international monetary and financial systems, global imbalances, a lack of regulations, and large-scale worldwide labour supply shocks resulting in excesses in money and liquidity. In this regard, a more wide-ranging view was presented by Jagannathan, Kapoor & Schaumburg (2013), who state that the causes of the financial crisis may be considered as outcomes stemming from the inability to deal with events, whether in terms of emerging economies to absorb savings through consumption and domestic investments as a result of poor national financial markets, or the inability of exchange rates to adopt the role of shock absorbers as a result of capital controls encouraged through immediate national objectives, or even the lack of ability of the economy in the US to adjust to the incentives induced through significant monetary inflow, resulting in balances and checks breaking down across different financial institutions.

In this regard, it has been indicated by a member of the Executive Board of ECB (Gonzalez-Paramo, 2011b), that the aforementioned aspects and characteristics could have underpinning the crisis, with these same views detailed in other works, such as those by Cabal (2013), Firtescu (2012), Vermorken (2011), Sakbani (2010), Stiglitz (2010), and detailed as follows:

- The significant degree of lending by the financial and private sectors as a result of the low interest rates;
- The increase in financial disequilibria and asset price bubbles;
- The biased incentives-based system that resulted in investors taking excessive risks;
- Regulators neglecting to adapt to the financial system’s changes;
- Failures in the market in relation to data asymmetry and the lack of risk transparency inherent in various products;
- The presence of clear conflicts, subsequently impacting the key agents deemed necessary in securitisation; and

- Investors neglecting to carry out their due diligence, and instead depending on data and models that seemed unsuitable in directing consideration to relevant risks.

In the view of Cabal (2013), global financial crisis causes include inadequate levels of liquid assets and low bank capital, notably stemming from expansions in balance sheets and significant liquidity risks, as well as a lack of alignment between liabilities and assets, and these being funded with liabilities incurring low liquidity premiums. Accordingly, the volume of reserves as possessed by banks was considered either inadequate quality or insufficient overall when considering asset values and their reductions and write-offs (Vermorken, 2011). The extreme leverage in off- and on-balance sheets, alongside the steady decline in capital base quality and levels, and banks holding poor liquidity levels, are all recognised as some of the key factors responsible for the extremity of the crisis (BIS, 2010b). Furthermore, it is recognised that the banking system was unable to absorb credit losses and systematic trading, and was unable to deal with large off-balance sheet exposures and the reintermediation of such, which had been pivotal in creating the shadow banking system.

Through a procyclical deleveraging process combined with interlinked systematic institutions through a number of complicated transactions, the crisis escalated further. Throughout the most significant crisis phase, a decline in confidence was recognised in the market in terms of the liquidity and overall solvency of a number of banking institutions. Banking sector weaknesses were transmitted across the financial system and real economy, subsequently causing a significant contraction of credit availability and liquidity (BIS, 2010b).

The financial crisis's causes can be reviewed as being a lack of caution in the ability of portfolio management to derive returns, with models and data poorly positioned to predict risks, monetary authorities showing a willingness to mitigate asset price downturn effects, market efficiencies (Gonzalez-Paramo, 2011a), a lack of financial system supervision, poor understanding in regards financial innovation, transparency in accounting rules, and conflict of interest in various areas, including rating agencies and collateralise debt obligations/mortgage issuers (Vermorken, 2011).

A number of organisations and professionals in the arena have examined the causes of the recent global financial crisis; however, a summary in this regard has been provided by Jickling (2009), who indicates the causes on a more in-depth and wider scale. These are recognised as accounting, credit default swaps (CDS), deregulatory legislation, failure of risk management systems, financial innovation, fragmented regulation, global imbalances, government-mandated subprime lending, housing bubble, human frailty, imprudent mortgage lending, a lack of transparency and accountability in mortgage finance, mark-to-market accounting, non-banks runs, , no systematic risk regulator, off-balance sheet finance, rating agencies, securitisation, shadow banking system, complexity, bad computer models, excessive leverage, relaxed regulation of leverage, over-the-counter derivatives, short-term incentives, tail risk, and the black swan theory. Furthermore, there is also a need to highlight the fact that, in various instances, the failure stems from a number of different factors in combination rather than just one.

It is acknowledged on a wide scale that one of the factors underpinning the crisis is the deviation from well-established principles in risk management, chiefly demonstrated by financial institutions. The essential and critical risk management practices state: ‘know your counterparties’, ‘invest only in products you understand’, ‘do not outsource credit risk management by relying exclusively on external credit assessments’, and ‘do not rely exclusively on quantitative models, however sophisticated’ (Gonzalez-Paramo, 2011). In this regard, it is accurate to state that most of these teachings were not implemented.

From a more wide-ranging and holistic approach, a lack of rules and regulations, alongside human decisions, may also be recognised as human passion-led behaviours, as noted by (Mortreul, 2010): in this vein, it is stated that credit risk management was not considered well, with borrowers instrumentalised, financial and technical innovations permitted for risk exposition diffusion, complexity not well managed, and accounting norms alongside financial reporting not directed towards improving and rebuilding confidence and trust. A comparable view can be seen adopted in the work of Ashby (2010), who emphasises the importance of behavioural aspects more so than methods: communications weaknesses across various financial institutions, cultural and human inadequacies across the industry, as well as at inter

and infra-firm levels, a lack of consideration across credit unions and investment firms, and a lack of adequate supervision.

A number of lessons can be gleaned from this situation, with Mortreuil (2010) recognising the value of sound regulations, first and foremost. A financial regulations system needs to be recognised as far, reliable and strong, with endemic incentive issues within and across the financial sector needing to be managed so as to overcome the encouragement of short-termism and excessive risk-taking (Kapoor, 2010). In this regard, there is a need for the principle of corporate governance to be actively applied and shared responsibly, with the link between those regulating and regulators requiring supervision, competence and expertise, and the ability to make changes (Kane, 2012). Furthermore, accountability, consumer respect, fair wages and fair pricing all need to be implemented (Mortreuil, 2010). Furthermore, alongside changes in financial and regulations arenas, institutional and policy changes need to be made so as to encourage greater savings in developed countries, with legal reforms needing to encourage capital in developing regions in an effort to help global recovery (Jagannathan, Kapoor & Schaumburg, 2013), as well as the application of the necessary financial system structural changes (Kapoor, 2010). In this regard, an in-depth examination into financial architecture, regulations and regulators, as well as their capacity and roles, may be seen in the work of Moshirian (2011).

Importantly, as noted above, important lessons can be garnered from the financial crisis, with Ashby (2010) providing an overview in this regard, stating that financial institutions need to consider improvements in risk cultures, internal control and compensation arrangements. Moreover, regulators need to ensure awareness in the fact that online restricted capital requirement increases can be rationalised, whilst notable increases would be costly. As such, there is a need to emphasise not what should be implemented but how implementation should take place, with suitable market incentives needing to be encouraged.

2.1.3.1. The Role of Risk Management during Financial Crisis

Credit risk management is a fundamental aspect of any wide-ranging approach to risk management, and is considered fundamental in the long-run when seeking to achieve banking success (BIS, 2000). Credit risk management seeks to limit losses as a result of the credit risks stemming from customers, as well as any risks inherent when striving

to achieve a good risk/return ration. There is a need for banks to ensure insight into identifying, measuring, monitoring and controlling credit risk, whilst also establishing that adequate capital is held against such risks, with any risks seen to arise afforded suitable compensation (BIS, 2000). Prior to the financial crisis, many banks were seen to have made significant investments in improving their credit risk management; in particular, banks invested in methods, processes, resources and technology geared towards the assessment, monitoring, management and modelling of their credit risk (KPMG, 2007). The more conventional credit risk measurement frameworks have been devised in line with new approach frameworks (Saunders & Allen, 2002):

- Mortality models, such as Credit Risk Plus;
- Optional pricing model, such as KMV and Moody's;
- Reduced form models, such as KPMG and Kamakura;
- Time varying models, such as Credit Portfolio View; and
- VAR models, such as CreditMetrics.

The key factors underpinning the implementation of these approaches were (Saunders & Allen, 2002):

- Declining and volatile values of collateral;
- Disintermediation;
- More competitive margins;
- Structural increase in bankruptcies;
- Technology;
- The BIS risk-based capital requirement; and
- The growth of off-balance-sheet derivatives.

Nonetheless, a number of scholars have come to identify either insignificant effects following the crisis or, conversely, positive effects. In one such work, it was found that there had been an increase in banking efficiency in China throughout the period of crisis (Yao, Chen & Wang, 2011), whilst a comparable less effect was seen across the Turkish banking sector (Gencer, Orhan & Sahinbas, 2011), with the scholars recognising this as an outcome of restructuring. On the other hand, however, Önder & Özyildırım (2013) recognised credit-owned banks as making a positive contribution in terms of decreasing the negative effects of the crisis and accordingly further

improving economic growth in Turkey. The insignificant effects of the crisis on the Oman banking sector's profitability was detailed in the work of Sangeetha (2012), with domestic commercial banks showing a relatively higher level resilience. However, Bourkhis & Nabi (2013) drew a comparison centred on the soundness and performance of conventional banks with Islamic banks during the period of the financial crisis, notably taking into account 16 countries, with the significant differences between the two categories not identified by researchers; however, Islamic banks were seen to perform somewhat better both during and following the crisis period. On the other hand, better performance was seen across conventional banks chosen from OIC countries in the work conducted by Mobarek & Kalonov (2014), with the variation in banking sector behaviours throughout the period of crisis also documented in the studies by Dias & Ramos (2014) and Xiang, Shamsuddin & Worthington (2015).

A number of works have been carried out in the Pakistani context, although they are lacking in scope. In the work of Haque & Tariq (2012), for example, the efficiency of conventional and Islamic banks in the country was examined, with an overall decline noted in banking sector efficiency throughout the years 2006–2009. Islamic banks were found, in this regard, to be more efficient. Generally speaking, banking efficiency in Pakistan was examined without consideration to the effects of the financial crisis, with comparable findings detailed in Phulpoto, Shah & Shaikh (2012); the latter established better performance across Islamic banks during the period of crisis. Nonetheless, a small sample comprising four banks from each side was utilised by Nazir, Safdar & Akram (2012), who further identified a significant effect associated with the global financial crisis in terms with the relative ability of different financial performance determinants to explain its variations. This study's main emphasis is placed on financial performance determinants, with the effects of crisis also afforded some consideration. It is believed that a more wide-ranging research in order to establish the effects of the crisis on the Pakistani banking sector can provide valuable contributions in the wealth of knowledge known in this regard. This is addressed in the current study through analysing the effects of the global financial crisis on Pakistani banks' financial performance and efficiency.

The 2008–2010 financial crisis is commonly recognised as the worst since the 1930s' Depression, as noted above, with the global financial crisis known to have had a notable impact on the performance of the performance of financial institutions and

competition across the financial systems. This has reintroduced the discussion pertaining to the sensitive link between commercial banks' performance and macroeconomics, which are recognised as the most critical of financial institutions for the economy.

Works centred on explaining the link between banking performance and business cycles (Albertazzi & Gambacorta, 2009; Athanasoglou, Brissimis & Delis, 2008; Bolt, de Haan, Hoeberichts, van Oordt & Swank, 2010) have been followed by new evidence relating to bank performance determinants throughout the financial crisis period (Beltratti & Stulz, 2012; Berger & Bouwman, 2011; Dietrich & Wanzenried, 2011). Furthermore, in some area, including the EU, for example, the crisis's ever-expanding reach and ongoing banking insecurities have warranted state support and the need for banking system performance to undergo reassessment (Efthyvoulou & Yildirim, 2014).

Regardless of its value from the standpoints of both research and policy, however, very few papers have examined the effects of the global financial crisis on European banks and their efficiency. As far as the researcher is aware, Isik & Hassan (2003), Sufian (2010), Luo, Yao, Chen & Wang (2011), Chortareas, Girardone & Ventouri (2013) and Moradi-Motlagh & Babacan (2015) are the only researchers to have applied the frontier approach whilst carrying out an empirical study in an effort to analyse the effects of the crisis on the efficiency of banks.

Their findings garnered in this work emphasise a notable decrease in 2009, not only in efficiency but also in cost and profit. There are a number of values for cost and profit efficiency spanning countries or groups of banks. Banks' average cost efficiency in the sample was seen to be 0.9624, with notable differences across banking groups. The findings show that, overall, scores of cost and profit efficiency in the case of larger banks are much greater than those of small and medium banks. Furthermore, greater efficiency can be seen in the case of publicly traded banks. Moreover, more efficiency in regards profit efficiency is identified in Eurozone banks, although cost efficiency makes them less efficient. In addition, banks from old EU member states are seen to be more efficient in terms of profit than banks that are new EU members.

2.2. Theoretical Literature

2.2.1. Agency Cost

The theoretical literature available in regard to banks' risk-taking determinants—and, in particular, research analysing the link between the capital of a bank and risk positions—commonly derive contrasting findings. One of the key rationales behind this is owing to the fact that the majority of the hypotheses are non-exclusive: for instance, information asymmetry and agency cost problems could have a notable impact on risk–bank capital trade-offs, as highlighted by Jensen (1986) and Berger (1995), which goes some way to describing why some institutions could react to increased capital requirements through taking on more risk, whereas others could decrease leverage (Altunbas et al., 2007).

A number of trade-offs are recognised between bank risk-taking and their efficiencies, and the fact that market prices are associated with risks and inefficiencies (Kwan & Eisenbeis (1996). In contrast, however, other scholars (Shrieves & Dahl, 1992; Jacques & Nigro, 1995) recognise that bank capital and risk positioning-related changes, as implemented by the management of banking institutions, are both established and affected by endogenous and exogenous factors. Overall, there is a tendency amongst management to offset capital increases with risk increases; however, such trade-offs are affected, to a significant degree, by regulatory pressure. Specifically, regulatory pressure, as highlighted in the new risk-based banking capital criteria, appear to have been valuable in terms of offsetting banks' inclination to increase their risk-taking and become involved in risky behaviours, which is an activity most prevalent amongst those with low capital (Kwan & Eisenbeis ,1995).

Both veins of research imply that in-depth examination into the way in which management responds to the market pricing of efficiencies and bank risk may be warranted, along with attention directed to how this impacts the capital decisions made by banks in contrast with the incentives to engage in excessive perquisite consumption and higher levels of risk-taking. Specifically, the works of Jensen (1986) and Stultz (1990) suggest that there are a number of theoretical justifications centred on the view that asymmetries between agency costs and information could have a notable effect on such trade-offs, and could potentially explain why some entities respond to higher

capital costs by shouldering a greater degree of risk, and why some reduce risk whilst others consume perquisites.

The view of Jensen (l986), as an example, suggests that managers' roles are centred on being stockholder agents, and are known to be burdened with conflicts of interest that can shape and impact asset selection, and the behaviour, efficiency and overall performance of a firm. Managers seem to maximise their own levels of implicit and explicit compensation to the detriment of shareholders, especially when they are risk-averse. Owing to the fact that both power and managerial compensation are commonly associated with the growth of organisations and with larger business size, there may be the tendency amongst management to maximise business growth beyond efficient size. Of course, this is dependent on the overall operational efficiency of the entity, with returns lowered, thus going against shareholder interest. It decreases operational efficiency, lowers returns and works against the interests of shareholders (Jensen, l986).

Agency problems are also considered, in theory, to encourage management to evade capital market monitoring through depending on the financing of investment in an internal rather than external nature. In actuality, there is the tendency to demonstrate project over-investment, including making investment in negative net present value. They will engage in inefficient behaviour when there is free cash available. This issue of investment and its financing becomes more serious when there is asymmetric information on the quality of investment projects between management and the shareholders. In the case of banks, it is generally thought that their assets are opaque, and hence, this asymmetric information problem may be particularly critical with respect to their asset choice (Jensen, l986).

2.2.2. Depositors Protection Schemes

The work of Hughes, Lang, Mester & Moon (1994) provides a somewhat different hypothesis in regard to the link between risk-taking and efficiency, and is seen to have a contrasting sign prediction. The scholars recognise that the more conventional efficiency estimations and production functions are derived in line with the postulation of risk neutrality; however, when a significant portion of managers' wealth of human capital is linked with firm performance, managers may be seen to be risk-averse as opposed to risk-neutral. Accordingly, within the domain of risk aversion, management

might be more inclined to trade-off reduced earnings in favour of reduced risk. By implementing such an approach, additional costs are incurred when making loans and monitoring loan performance, which would be recognised as measured inefficiencies. In line with the hypothesis offered by the aforementioned scholars, it might be expected that a positive link between asset quality and inefficiency measures would be identified, with higher loan quality measures seen to be linked with higher inefficiencies.

Furthermore, according to (Kwan & Eisenbeis, 1995) the literature also suggests that bank risk might not only have an impact on inefficiencies and leverage, but also could be dependent on inefficiencies and leverage itself. With this noted, managers might be encouraged to take more risk in an effort to offset greater capitalisation as Management may be induced to offset higher capitalization by taking more risk. In banking, the leverage decision is more complex (Kwan & Eisenbeis, 1995).

In the banking context, the decision to leverage becomes more complicated when considering deposit insurance and regulation, which means some of the conclusions drawn in line with the corporate finance literature might change. It is paramount to consider the effects of the federal deposit insurance regulations and structure on the risk of banks and the return trade-off in the context of a portfolio theoretic framework. The effects on bank incentives as a result of deposit insurance, to take risk and exploit deposit insurance subsidy, are analysed. Such an empirical and theoretical work suggests that deposit insurance value is enhanced with the increase in asset, risk and leverage. It indicates that the value of deposit insurance increases as asset risk and leverage increase.

2.2.3. Managerial Moral Hazard

According to (Kwan & Eisenbeis, 1995), it is also highlighted by theory that, between risk-related premiums in the control of moral hazard behaviour and those capital standards aimed at risk-taking limitation, there is an isomorphism. In other words, theory demonstrates that there is an isomorphism between risk related premiums to control moral hazard behaviour and capital standards designed to limit risk taking.

Upon understanding of the correspondence between bank capital requirements and risk-based premiums, there was an ever-growing concern expressed to suggest that institutions might be encouraged to take on a greater degree of risk in order to offset

higher capital requirements as a result of increases in regulatory capital requirements; unquestionably, institutions should be operating in a safer, sounder manner. Kwan & Eisenbeis continue that others have prioritised developing more in-depth understanding of the monitoring role, seeking to offset institutions' incentives to modify their portfolios upon the making of capital decisions or the establishment of risk-related premiums, in an effort to rebalance portfolios in order to take on more risk. In short, once this correspondence between risk-based premiums and bank capital requirements became understood, concern began to be expressed that increases in regulatory capital requirements may have the perverse effect of inducing institutions to take on more risk to offset higher capital requirements rather than to induce institutions to operate in a safer and sound manner (Kwan & Eisenbeis, 1995).

In the view of Hughes & Mester (2008), the literature on financial intermediation implies that, through monitoring and screening lenders, banks are able to overcome possible moral hazard and adverse selection problems caused as a result of the imperfect information between lenders and borrowers.

The capacity of banks to restructure and reduce asymmetries between lenders and borrowers, and their capacity to shoulder risks, are at the foundation of bank production. Such abilities are fundamental components of bank output, and are seen to have a significant impact on the managerial incentives to produce financial services with efficiency and care. That banks' liabilities are demandable debt gives banks an incentive advantage over other intermediaries. The notably high level of debt in the capital structure of a bank means managers are disciplined in their risk-taking and diligence in creating financial services through making the bank vulnerable to an ever-increased risk of insolvency (Hughes & Mester, 2008)

Debt's demandable aspect, if not entirely insured, would result in additional safety concerns and performance pressure which will increase liquidity risk. Such factors are likely to mean banks are sound monitors of their lenders. Accordingly, the banking relationship is able to enhance bank customers' financial performance and accordingly improve credit access for organisations too informationally transparent to lend in public debt and equity markets (Hughes & Mester, 1998, 2009).

Throughout recent times, research centred on the efficiency of banks has reviewed various factors, including asset quality, and non-performing loans in particular.

Disregarding or failing to consider such a variable could result in an erroneous bank efficiency measure (Mester, 1996). This might be more apparent when considering that a large volume of non-performing roles could indicate banks' tendency to utilise fewer resources than usual in their credit assessment and loans monitoring processes. Moreover, non-performing loans result in banking sector inefficiency, as identified in the works of Altunbas *et al*. (2000), Fan & Shaffer (2004) and Girardone *et al.* (2004), owing to the fact that efficient banks are recognised as being better at credit risk management, as noted by Berger & DeYoung (1997).

When considering the quality and risk factors when completing cost efficiency assessments in the context of Japanese commercial banks throughout 1993–1996, it was found by Altunbas *et al.* (2000) that the level of non-performing loans can be positively linked with the inefficiency of banks. Moreover, there is a tendency of banks to exhibit efficiency decreases following risk factor control. Furthermore, banks tend to experience a decrease in their scale efficiency level after controlling for risk factors. This finding also could be in line with the research of bank efficiency levels in the USA, as carried out by Hughes & Mester (1993), as well as on the assessment of cost efficiency in the context of Italian banks, as completed by Girardone *et al.* (2004).

In contrast, the profit efficiency of large commercial banks in the USA has been analysed by Fan & Shaffer (2004) through consideration to non-performing loans. The work established that, despite non-performing loans having a negative relation to the profit efficiency of banks, such a relation is not statistically significant.

In the view of Fiordelisi, Marques-Ibanez & Molyneux (2010), throughout more recent times, there has been a greater degree of integration and liberalisation witnessed amongst European banking systems in regard to greater service and product deregulation. Such a progressive process in the domain of financial integration has gone some way to improving competition and accordingly highlighting the value of financial institutions' efficiency. Nonetheless, a number of authors pose the view that such an increase in competition could result in greater bank risk-taking incentives—even if just in the short-term (see, for example, Danthine *et al*., 1999; Hellman *et al*., 2000).

Such incentives have been recognised as needing to be counterbalanced by regulators through facilitating a more prominent role to be played by capital adequacy

in the banking regulatory process. In this regard, as a result of both market and regulatory pressures, the majority of European banks have fallen under pressure to increase and improve upon their capitalisation.

One further valuable aspect for consideration is concerned with whether the link between capital, efficiency and risk differs for those banks with different ownership frameworks. One of the few sectors in which mutual, private and public organisations work together in a competitive market is that of European banking (Goddard *et al*., 2001). Importantly, however, there is little empirical guidance to suggest whether there are systematic differences apparent in the link between efficiency for banks with different ownership characteristics, and capital strength.

When considering that both mutual and public banks recognise a number of economic and/or social development objectives, it may be predicted that different risk-taking and performance features may be apparent when comparing such institutions with those functioning in the private sector. A number of theoretical works have demonstrated that an efficiency/competitive advantage may be identified in mutual banks, even if they show expense preference behaviours (Purroy & Salas, 2000; Berenguer *et al*., 2003).

When considering the model underpinning these hypotheses, and as noted by various scholars (Hughes & Moon, 1995; Hughes & Mester, 1998), capital and risk are likely to be influenced by the efficiency level of the banking entity. Through a regulatory lens, considering all other things equal, it may be that regulators allow an efficient firm with improved management to benefit from a greater degree of leverage. In contrast, however, from a more moral hazard perspective, a less efficient organisation could be tempted to take on higher risk in an effort to counterbalance the lost returns. In turn, efficiency could also affect bank risk level (Berger & De Young, 1997). For instance, managers who are not very efficient at assessing and monitoring loans are not likely to be very efficient in achieving a high level of operating efficiency. Lastly, the decision might be made by a bank to opt for maximising short-term profits through decreasing the volume of funds assigned to the allocation and monitoring of loans. Other things being equal, this would mean that the risk and efficiency measures would be boosted in terms of creating a positive link between efficiency and risk—at least in the short-term. Earlier studies analysing the various determinants of banking risk consider the

fact that both risk and capital are established on a concurrent basis (Shrieves & Dahl, 1992; Jacques & Nigro, 1997; Rime, 2001a). Moreover, it may be that risk and capital are established at once through the efficiency levels demonstrated by the banking firm (Kwan & Eisenbeis, 1997; Hughes & Moon, 1995; Hughes & Mester, 1998).

Accordingly, capital, efficiency and risk are all interwoven, which implies that any empirical approach applied in an effort to model the links between capital and risk also need to take into account the efficiency of the bank. When examining such links, it is also necessary to consider various bank ownership types owing to the fact that a different impact on capital, efficiency and risk could be apparent across mutual, private and public banks as a result of agency issues.

2.3. Empirical Literature

The empirical literature centred on the effects of banking capital regulations can be associated with the research centred on bank efficiency, as highlighted by Kwan & Eisenbeis (1997). In line with the work by Hughes & Moon (1995), the aforementioned authors pose the view that it is fundamental to ensure the explicit recognition of the concept of efficiency along with consideration to those empirical models linking the relationship between bank risk and capital. By so doing, such researches have provided a link between the literature considered earlier with financial regulation effects on risk-taking and the rich empirical work available on bank efficiency. The findings emphasise that both capital and efficiency are determinants that should be considered in regard to moral hazard incentives and risk-taking amongst banks.

The majority of research has centred on efficiency comparisons between mutual and private banking institutions in the USA. For instance, the work of O'Hara (1981) and Nicols (1967) suggests that mutual organisations are likely to demonstrate greater efficiency when compared with those operating in the private sector. In this regard, mutual firms are seen to be more efficient, as determined by Mester (1989, 1993), whilst the work of Cebenoyan *et al*. (1993), on the other hand, implies no variation between mutual and joint stock Savings and Loans (S&L) banks in terms of efficiency. Various other studies have determined preference behaviour in mutual banks in the USA (Akella & Greenbaum, 1988; Krinsky & Thomas, 1995).

In this vein, Berger & De Young (1997) and Kwan & Eisenbeis (1997) make reference to the importance of explicitly acknowledging the bank efficiency concept in empirical frameworks centred on examining banks' risk determinants. The work of Berger & De Young (1997) emphasise that reductions in cost efficiency precede increases in problem loans (specifically at thinly capitalised banks). Moreover, it is also recognised that problem loans commonly lead to cost efficiency decreases. In this regard, it was recognised by Kwan & Eisenbeis (1997) that poorly performing banks are seen to be at greater risk of risk-taking, with highly capitalised banks also seen to be more efficient than less capitalised banks.

The efficiency levels of banks could have a notable impact on the future risk of banks. In consideration to the 'bad management' hypothesis highlighted by Berger & DeYoung (1997) and Williams (2004), banks functioning at low efficiency levels experience larger costs as a result of inadequate monitoring in credit and poor control of operating expenses, as can be seen immediately when examining lower cost efficiency. Moreover, non-performing loans result in banking sector inefficient, as identified in the works of Altunbas *et al*. (2000), Fan & Shaffer (2004) and Girardone *et al.* (2004), owing to the fact that efficient banks are recognised as being better at credit risk management, as noted by Berger & DeYoung (1997).

The assumption is made by the 'cost skimping' hypothesis that there is a trade-off to be made between short-term cost efficiency and future risk-taking as a result of the various factors of moral hazard. In this instance, banks seem to be more cost-efficient when dedicating fewer resources to credit monitoring and screening activities. Accordingly, non-performing loan stocks appear to be unaffected in the short-term. In the medium-term, however, greater risk levels could be reached by banks when considering their need to procure those additional inputs fundamental to administering future higher risks. In regard to the efficiency of revenues, greater short-term profit levels are commonly identified at the cost of less stringent credit screening. This also is usually apparent in higher future risks. Otherwise stated, it may be that a bank is tempted to increase revenues through taking on higher risks in an effort to counterbalance lost returns (Fiordelisi, F., Marques-Ibanez, D., and Molyneux, P. 2010).

According to Fiordelisi, Marques-Ibanez, and Molyneux, (2010) there is what is referred to as the 'bad luck hypothesis', which is recognised as associated with the outcomes of bank risk increases on levels of efficiency. In other words, it is related to the consequences of increases in bank risk on efficiency levels. The view is posed that external exogenous events (such as unexpected shocks, for example) have the propensity to increase the number of problem loans for banks that are not in line with the skills or risk-taking tendencies of the managers, which means that banks that are unrelated to managers' skills or their risk taking appetite would be exposed to these external exogenous events. Such risk increases cause subsequent costs and managerial efforts to be invested. Therefore, in line with this hypothesis, it is stated that bank risk increases to precede cost and revenue efficiency declines. In other words, it is expected to have increases in bank risk to precede falls in cost and revenue efficiency. (Fiordelisi, F., Marques-Ibanez, D., and Molyneux, P. 2010).

The efficiency studies applied to the banking sector focus predominantly on conventional banking. The work of Berger & Humphrey (1997) surveyed 130 studies that apply frontier efficiency analysis to conventional financial institutions in 21 countries. They documented that the different efficiency approaches do not necessarily achieve consistent results (Berger & Humphrey, 1997)

The work of Berger (2007) centred on completing a critical review, using 100 research drawing a comparison between different nations' banking inefficiencies. It was established that foreign-owned banks have efficiency disadvantages relative to domestically owned banks, with the former more likely to outweigh the efficiency advantages in developed nations, with a contrasting result witnessed in developing nations.

In the literature pertaining to traditional banking, scholars have provided a link between efficiency and various factors. Some works have centred on completing cross-country comparisons in regard to the efficiency of conventional banks, such as that by Bonin *et al*. (2005), which examined eleven transition countries (In their study, they have included observations for commercial banks from Bulgaria, the Czech Republic, Poland, Romania, Russia and Hungary over the period 2005 to 2011. Financial and banking crises took place in Bulgaria, over the period 1996 to 1997, in Russia, in 1997 and in Romania, over the period 1998 to 1999. Czech Republic, Hungary and Poland

were less affected in comparison with the other countries. The 2000s have marked the beginning of the revival of the economic growth in these countries. In these conditions, in Eastern Europe, the global financial crisis occurred after a period of economic growth, financed mainly by external loans, which generated an economic environment characterized by an increasing disequilibrium) and accordingly identified that foreign-owned banks are seen to be more cost-efficient than other banks, and were also seen to deliver improved service, specifically if a strategic foreign owner was in place. (Bonin *et al*. 2005),

Furthermore, other efficiency-based researches carried out recently also have taken into account country-specific environmental factors: the work of Bos & Kool (2006), for example, utilised the dataset of 401 largely independent cooperative local banks in the Netherlands, and established that utilising exogenous input prices as opposed to endogenous input prices is paramount for the cost frontier, owing to the fact that cost inefficiencies spread is seen to be more plausible and larger. Moreover, the research further emphasised that a number of the environmental factors in the nation affect efficiency score to some degree. Researchers have also focused on conventional banks' levels of efficiency in line with their diversification, size and specialisation, and type, such as wholesale or retail banking. In this vein, the research by Kwan (2006), carried out in a Hong Kong context, established that the x-efficiency of banks was seen to drop in line with various characteristics, including bank size, deposit-to-asset ratio, loan growth, loan loss and loan-to-asset ratio, whilst off-balance sheet activities achieve an increase in x-efficiency. Comparably, other researchers have drawn a contrast between the efficiency scores of foreign-owned banking institutions with that of domestic-owned entities. In this vein, the work of Isik & Hassan (2002), which centred on analysing Turkish banks, established that foreign banks, both in subsidiary and branch forms, are more profit-efficient and incur higher costs than their domestic counterparts; however, profit efficiency differences are seen to be far more apparent.

2.3.1. Efficiency

During more recent times, works centred on the efficiency of banks have considered asset quality, specifically in consideration to non-performing loans. Neglecting to consider such a variable could ultimately result in an incorrect bank efficiency measure (Mester, 1996). This is recognised as true owing to the fact that a significant volume

of non-performing loans could indicate banks making use of a smaller number of resources than is common when conducting loan-monitoring and credit assessments. Furthermore, non-performing loans could result in banking sector inefficiency, as has been established in a number of works, including those by Altunbas *et al*. (2000), Fan & Shaffer (2004) and Girardone *et al.* (2004). This is owing to the fact that those banks seen to be efficient are more capable in terms of credit risk management, as noted by Berger & DeYoung (1997).

When taking into consideration various quality and risk factors when completing an estimation as to the overall cost efficiency of Japanese banks for the specific period spanning 1993–1996, it was found by Altunbas *et al.* (2000) that the level of non-performing loans was positively linked with the inefficiency of banks. Moreover, there was a tendency amongst banks to face a decline in their overall scale efficiency level following the control of risk factors. This finding is seen to be in line with the work carried out by Hughes & Mester (1993) on the efficiency of banks in the US through consideration to efficiency, as well as on the overall assessment of cost efficiency amongst Italian banks, as highlighted by Girardone *et al.* (2004). In contrast, profit efficiency in the case of larger commercial banks, based in the US, was examined in the study of Fan & Shaffer (2004) through consideration to non-performing loans. It was established that, despite non-performing loans being negatively associated with the profit efficiency of banks, nonetheless, it was not statistically significant (Abd Karim et al., 2010).

In the view of Sealey & Lindley (1977), in regards prior theory pertaining to financial firms, a lack of success can be recognised as owing to the incomplete or altogether inadequate application of the fundamentals underpinning firm theory. It has been noted by the scholars that other researchers have not been successful in suitably categorising the inputs and outputs of financial firms by failing to take into account the criteria on which a financial organisation makes a decision, and secondly through failing to examine the production and cost of a financial firm (Oluitan, 2014).

A number of different works have been carried out in the field of bank efficiency, although the majority are based on transition and developed economies. Such papers have placed emphasis on various elements of the banking sector, with Berger & Humphrey (1997) completing a survey-based research, taking into consideration 130

past works spanning 21 different countries. It has been found that a number of different methodologies are unable to provide consistent results. Inefficiency, as a concept, is a not a phenomenon seen to be related to the under-developed, but rather is seen to span across various levels of development. In this vein, the work of Berger *et al*. (1997), which took a sample of 760 branches of large US commercial banks, implies that there are as many as double the number of branches that could achieve minimised costs with 'an X-inefficiencies of more than 20% of operating costs'. Casu & Molyneux (2003) provide support for this view in their work of the European banking system through the application of the Tobit regression model approach. It has been established that, following the EU legislative harmonisation, minor improvements have been made in regards bank efficiency.

In the literature, the concept of inclusion pertaining to various country- and firm-specific variables that could potentially contribute in terms of the variations in the efficiency term has been discussed. This approach has been considered in the work of Battese & Coelli (1995), which centred on a panel study of 14 paddy farmers from an Indian village. It was found that a framework for technical inefficiency effects, which encompasses a constant term, age, year of observation and schooling of farmers, was a critical element in the stochastic frontier production function. In this regard, Hollo & Nagy (2006) directed attention towards this concept when completing their work on bank efficiency in the enlarged European Union, with consideration centred on the effects of controlling for country-specific factors that do not necessarily stem from the operational environment of banks. It was established that controls for such factors help to minimise the scale of the gap between new and old member states, and the same in reverse.

Various works on efficiency have sought to analyse the concept of banks' ownership, with the work of Hauner (2005), utilising a sample of large German and Austrian banks, coming to find that state-owned banking institutions demonstrate a greater degree of cost-efficiency (potentially owing to the availability of lower cost funds), whereas cooperative banks, on the other hand, are only as cost-efficient as private ones. The foundation of the present work may be seen as comparable to that of Chen (2009), whose work analysed the overall efficiency of banks in Sub-Saharan African middle-income countries. It was recognised that, on average, banks were positioned to save up to 30% of their overall costs if they were to operate on the efficient frontier. In a

comparable vein, it was noted that foreign banks are far more efficient that both domestic and public banks. The work of Ikhide (2009), focused on commercial banks in Namibia, was carried out along the same vein, with the view outlined that commercial banks in the country are positioned to improve their overall efficiency through improving their scale of operation, although the present level of input combination was not found to achieve maximum efficiency.

In regards commercial banks, these have been seen to operate in an environment that is becoming more and more competitive (Isik & Hassan, 2002; Mester, 1997; Yeh, 1996). With commercial banks functioning in this environment, long-term viability is seen to depend on their overall efficiency (Mester, 1997), where the effective and efficient use of resources is seen to be critical to all bankers. Although this consideration has always been afforded recognition and relevance, worldwide trends, as in the cases of increasing competition for financial services, technological innovations, deregulation and banking consolidation, have induced more much more attention in terms of controlling costs and ensuring a greater degree of efficiency to products and services (Spong, Sullivan & De Young, 1995; Ncube, 2009).

The determinants of bank performance in transitional economies have been examined by Grigorian & Manole (2002), with the scholars predicting efficiency through the adoption of the Data Envelopment Analysis (DEA) approach before running a Tobit-censored regression with the aim of identifying bank efficiency determinants. The key findings imply that foreign ownership and consolidation can improve the overall efficiency of a commercial bank. They further note that well-capitalised banks, GDP per capita and greater market share are more positive determinants of bank efficiency. Furthermore, evidence has been garnered to imply that non-bank financial institutions and the securities market play a role in decreasing bank efficiency. In this vein, the DEA method has been adopted by Casu & Molyneux (2003) in an effort to examine European banking systems' productive efficiency and whether or not improvements and convergence has been witnessed for the period spanning 1993–1997. Furthermore, the Tobit regression was implemented with the aim of establishing the key factors underpinning European bank efficiency. The findings suggest that profitability ratios may be positively linked with bank efficiency, in addition to public-listed banks; on the other hand, no link between the extent of capitalisation and bank efficiency was identified. In this regard, the cost efficiency of Greek banks, alongside

their determinant factors, was examined in the study of Pasiouras *et al*. (2007). A DEA method was implemented in estimating allocative, cost and technical efficiency, with a Tobit regression applied in order to establish the external and internal factors affecting bank efficiency. The key findings suggest that, amongst Greek banks, an average efficiency of 82% was identified. Moreover, it was noted that bank size is positively linked with a greater degree of bank efficiency; nonetheless, it was recognised that GDP per capita and unemployment have an influential and negative effect on bank efficiency. In addition, it is stated that the number of branches, degree of capitalisation and quantity of ATMs also has an impact on the overall efficiency of banks depending on the measure of efficiency applied. In this regard, the determinants of efficiency and their dynamics have been examined in the work of Hassan & Sanchez (2007) in the context of the banking industry in Latin America. The findings garnered by the study show that the extent of capitalisation, interest rate spread, growth of GDP and profitability ratios are positively linked with greater efficiency amongst banks. In contrast, the value of stock traded, loan loss reserves and inflation rates have a conflicting relationship with bank efficiency. In this regard, the determinants of bank efficiency were studied by Delis & Papanikolaou (2009) in the case of ten newly acceded European countries. A semi-parametric two-stage framework was adopted in order to analyse the effects of industry-specific, bank-specific and macroeconomic variables on the efficiency of banks. The key findings show that foreign ownership, GDP growth and market interest rates are all positively linked with bank efficiency. In contrast, the concentration of the industry and credit risk both present a negative link with the efficiency of banks. In this vein, the level of bank efficiency in MENA countries has been evaluated by Naceur *et al*. (2009) through the application of a Meta frontier, as calculated by DEA. Subsequently, a Tobit regression was adopted in order to examine the effects of bank-specific, financial and institutional determinants of bank efficiency, with the results showing that, overall, MENA countries have achieved an efficiency score of 67%. In contrast, highly capitalised banks, stock market developments and greater liquidity all help to improve bank efficiency; higher market concentration, and greater credit to the private sector, on the other hand, are recognised as decreasing banks' efficiency levels. In a comparable way, the DEA methodology was applied by Daley & Mathews (2009) in an effort to estimate technical efficiency scores among a group of Jamaican banks for the period spanning 1998–2007. Conditional convergence was estimated through the use of panel data

estimation techniques, with the size of the bank and cost over income recognised as inversely linked to the efficiency of banks; on the other hand, growth in GDP is seen to have a positive effect in line with bank efficiency.

The determinants underpinning commercial banks' cost efficiency have been analysed by Kalluru & Bhat (2009) in the context of India for the period spanning 1992–2006. In an effort to calculate efficiency, the scholars adopted the SFA (Stochastic Frontier Approach) approach, before obtaining the determinants of the efficiency scores through the application of a Tobit regression. The preliminary set of findings suggests that, in commercial banks operating in India, cost efficiency has declined for the period of study. It has also been recognised that banks' earning capacity is the most critical positive determinant of bank efficiency, followed by various non-interest activities and diversification. Importantly, the determinants of bank efficiency in the context of Brazil, for the period spanning 2000–2007, were studied in the work of Tecles & Tabak (2010), with the Bayesian Stochastic Frontier adopted in an effort to identify bank efficiency determinants. The key findings show that large banks are the most profit- and cost-efficient, alongside foreign-owned banks. Moreover, a positive link between bank efficiency and capitalisation was recognised. Furthermore, in the study of Wezel (2010), the overall efficiency displayed by domestic and foreign banks in Central America was examined for the period 2002–2007, with the DEA and SFA methodologies adopted in an effort to secure efficiency estimates. The key findings imply that foreign banks are not always seen to demonstrate greater efficiency than domestic banks, and that larger banks are more efficient, overall, than smaller banks (Garza-Garcia, 2010).

2.3.2. Islamic finance:

Islamic finance centres on providing financial services in line with Islamic jurisprudence (Shari'ah). Shari'ah prohibits any involvement with interest (*Riba*), those products deemed as unnecessarily high-risk (*Gharar*), any product or service in the gambling arena (*Maysir*), short sales, as well as the financing of any activities deemed prohibited as a result of causing harmful effects. It further necessitates that parties adhere to various principles of fair treatment and alignment with contracts. It is required that transactions be underpinned by actual economic activities, with risk-sharing present in economic transactions (Kammer and Norat *et al.*, 2015)

Owing to Islamic finance products being contract-based, they may be categorised into three different groups, as recognised by Hussain, Shahmoradi & Turk (2015):

- Debt financing structured as sales: this might include sales with deferred payments and mark-up, as referred to as *Murabahah*, or those purchased made encompassing products' deferred delivery, referred to as *Salam* for basic products and *Istisna'* for manufactured products, with *Ijārah* referring to leasing with varying purchasing options. Pure lending is permitted but only when deemed benevolent *Qard*, which is commonly used in the case of current deposits.
- PLS—Profit-and-Loss-Sharing: This is very much like a financing option and encompasses two different modalities, namely profit-sharing and loss-bearing, and pure profit-and-loss-sharing. In the case of the former, this involves the investor or bank as the financier providing capital whilst the beneficiary provides labour and skills. The profits are shared, but losses are ultimately shouldered by the financier, who should not play a role in interfering with the overall conduction and management unless there is a breach of contract, negligence or misconduct. In regards the latter modality, this involves two parties partaking in the equity-like financing of a project, with profits and losses shared equally.
- Services, including agency contracts (*Wadi'ah*) and safe-keeping contracts (*Wakalah*), for current deposits and those widely used for money market transactions, respectively.

Although Islamic finance may be seen to include a number of different services, it remains that banking continues to dominate the sector, representing approximately 80% of all Islamic finance assets in 2013 (IFSB, 2014). Furthermore, the Sukuk market is known to be developing quickly, with assets equating to approximately 15% of the industry, with other services including equity markets, insurance, investment funds, microfinance and leasing (Kammer and Norat *et al.*, 2015).

Islamic finance is positioned to add further value in three different aspects. Primarily, it seeks to facilitate a greater degree of financial inclusion, particularly in regards large populations that may be considered without the necessary services. Secondly, it directs focus on asset-backed financing and risk-sharing elements, meaning there is the potential to provide SMEs with support, as well as public infrastructure investment.

Lastly, the fact it prohibits speculation and encompasses risk-sharing aspects imply that Islamic finance could essentially be deemed less risky from a systematic perspective than that of conventional finance. In order to achieve such potential, however, and to further enable the industry to develop both safely and soundly, various obstacles first need to be considered and overcome (Kammer and Norat *et al.*, 2015).

Over the past ten years, Islamic finance has witnessed considerable growth, with the banking segment recognised as becoming systematically important in a number of countries across a large range of regions. Accordingly, it is expected that Islamic finance will continue to grow and expand in line with economic growth, particularly in those countries where Muslim populations are, at present, without banking services. In this vein, it is also recognised that large savings garnered by a number of oil-exporting regions with the aim of investing in *Shari'ah*-compliant financial products are fuelling this growth.

The development witnessed across Islamic finance promises a number of potential advantages, amongst which there is the likelihood of less risk and potential of crisis owing to its risk-sharing aspect, which in turn increases sounder risk management and lower leverage from both customers and financial institutions. The view is also argued that Islamic finance demonstrates greater stability than conventional finance owing to the fact that: a) Islamic finance encompasses prohibitions in regards speculation; b) financing is known to be asset-based, meaning there is complete collateral; and c) it is recognised as being built on a foundation of strong ethical precepts. Furthermore, IFIs (Islamic Financial Institutions) are recognised as being a valuable platform in terms of increasing access to financial inclusion, as well as access to finance amongst SMEs, which ultimately encourages and facilitates economic development and growth.

Regardless, however, there do remain a number of challenges inherent in Islamic finance. As an example, irrespective of the attention directed towards the setting of standards through Islamic finance, the industry remains governed, in a number of regions, by a supervisory and regulatory model devised for conventional finance. As such, the unique nature of Islamic finance is not considered (Al-Maraj, 2014). Accordingly, the industry remains in its early stages, and therefore is seen to be lacking economies of scale whilst functioning in an environment where financial infrastructure,

legal and tax rules, and access to central bank liquidity and financial safety nets are either absent or, if available, are unable to fully consider the individual aspects of Islamic finance (Askari, Iqbal & Mirakhor, 2010; Ernst & Young, 2014; IFSB, IsDB & IRTI, 2010).

In consideration to the value of Islamic finance for its many members, the IMF has established and maintained a long-term interest in the outcomes potentially stemming from financial and macroeconomic stability. In this vein, a key role has been played in the introduction of the IFSB (Islamic Financial Services Board), with the IMF also considering the implications of Islamic finance for those members where it has been considered valuable, specifically in the context of its Article IV consultations and its Financial Sector Assessment Program (FSAP) assessments. Moreover, it has also delivered training and technical support in mind of providing countries with the ability to improve the supervision and regulation of Islamic banks, and the development of domestic Sukuk markets.

The more recent development witnessed across Islamic finance has resulted in greater demand in terms of the provision of policy advice and capacity-building across various aspects delivered by the IMF. Such requirements for advice will be likely to cause industry growth and an increase in systematic importance, especially in those areas linked with IB, macroeconomic policies and Sukuk markets.

In Islamic banking, under the Islamic *Sharīʿah* (Islamic law) any products, activities and derivatives with a speculative element, or otherwise with the ability to generate interest for benefit, is forbidden (Yahia, 2010). In an effort to explain Islamic banking precisely, Hawary (2004) suggests four main principles surrounding Islamic banking's operation from a practical perspective:

3. There needs to be risk-sharing across all financial activities.
4. All financial transactions need to have 'material finality', which means any financial activities in Islamic banking are required to be backed by collateral. This explains why most conventional derivatives are prohibited in Islamic banking.
5. There cannot be exploitation with any party involved in the transaction.
6. Sinful activities are not permitted to be financed, such as in relation to alcohol, pork products, pornography and gambling, etc.

According to Iqbal & Molyneux (2005), back in the 1970s, Islamic banking was a strange and unusual system. It was more centred on perfection, and once was considered 'wishful thinking'. Al-Ajmi *et al*. (2009), however, with an assets estimation of $1 trillion, suggests that such a high number of investments increased and publicised the overall concept of Islamic banking in the world, and thereby encouraged further countries to grant more licenses for such institutes.

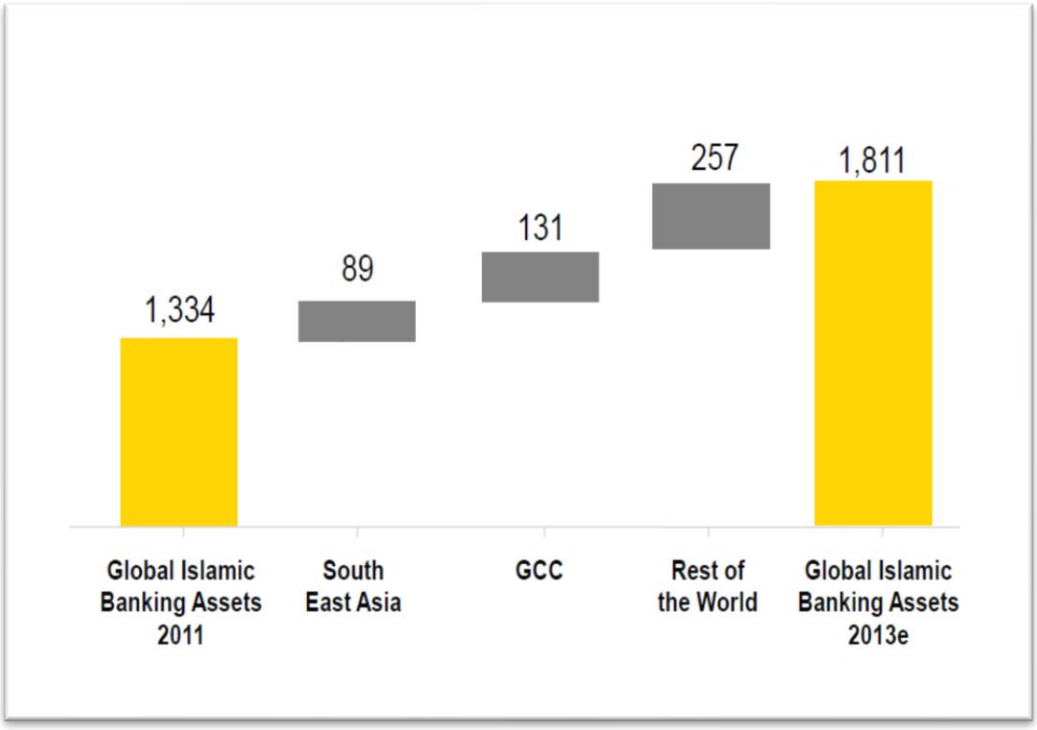

Figure 6. Islamic banking asset growth (US$b)

(Source: IMF, the Banker, Central Bank Reports, EY Universe)

In the current Islamic financial system, under *Sharīʿah* law, Islamic banks are not allowed to trade in highly leveraged companies. Practically speaking, however, Islamic banks can invest in only companies holding a 60:40 ratio of equity-to-debt capital structure (Salman, 2008). Haniffa & Hudaib (2007) argue that Islamic banks may be less attractive for those non-Muslims interested in investing in organisations with activities considered ethical. This might be resulting from Islamic banks being too complacent with the belief of having a captive market amongst Muslims who can be dragged by religious motivations.

A number of works have centred on the overall efficiency of Islamic Banking. The work of Hassan & Hussein (2003) examined the relative efficiency associated with the banking industry in the context of Sudan through directing consideration to a panel of 17 banks spanning a period of 1992–2000. A number of parametric and non-parametric approaches were carried out in order to analyse five efficiency measures, namely cost, allocative, technical, pure technical and scale efficiency scores. Overall, average costs and profit efficiency spanning this period were seen to be 55% and 50%, respectively, which suggests that the x-efficiency of these banks in Sudan should be improved through ensuring the adequate management and allocation of their inputs.

Another work was carried out by Hassan (2003) centred on examining Islamic banking system efficiency in the contexts of Iran, Pakistan and Sudan, with the conclusion drawn that Islamic banking is much more cost-effective when contrasted with more conventional banking practices, whereas the same is not efficient when considering the overall generation of profit. Moreover, the work established that Islamic banks, which are large and are able to secure significant profits, are more efficient. In this same vein, another work was conducted by Brown & Skully (2003), which recognised that the Iranian banking system seems to be more established than that of the Sudanese system. The analysis was carried out for 35 banks across both countries, with the sound performance of Iranian banks recognised as owing to its banking industry being large. This factor is recognised as owing to the Iranian banking industry's cost efficiency. In Sudan, the banks being less cost efficient is believed to be owing to the agricultural primary sector's financing practices. The work carried out by Yudistira (2004) implements a DEA approach to analysing the scale and technical efficiencies of 18 different Islamic banks across 12 countries for the period spanning 1997–2000. Generally, the efficiency results imply that inefficiency across 18 Islamic banks is minor at just above 10%, which is recognised as notably low when reviewed alongside a number of other more conventional counterparts. The findings imply that there are diseconomies of scale in the case of small-to-medium Islamic banks. In this area, the work of Bader *et al*. (2007) estimated the cost, revenue and profit efficiency of 43 Islamic and 37 conventional banks for the years spanning 1990–2005 in 21 countries using DEA. It is suggested through the findings that there are no notable

differences between the overall efficiency results of conventional versus Islamic banks (Yudistira, 2004).

Similarly, a comparison was carried out between cost and profit efficiency of 37 conventional banks and 43 Islamic banks across 21 OIC countries, applying the SFA (Stochastic Frontier Approach) (Shamsher *et al*., 2008). The findings imply that there are no key differences identifiable between the overall efficiency results of conventional banks when compared with Islamic banks.

Nonetheless, across most of these works, focus is centred on a comparison of performance, particularly profitability, through the adoption of financial ratios, applying time constraints and a small volume of Islamic banks. Efficiency studies in the field of Islamic banking are scarce, which can be explained by three factors: the lack of good quality data, the problems associated with successfully modelling the uncharacteristic nature of Islamic banks' cost revenue model, and the need to accurately take into account various environmental conditions in different regions.

In specific consideration to the cross-country comparison on the efficiency of banks, the study of Berger (2007) summarised 100 studies, and recognised that efficiency has been measured using either: 1. the estimation of nation-specific frontiers; or 2. the estimation of common frontiers, such as specific variables in the estimation to account for countries differences. Although the former method ensures sample homogeneity, it does not allow authors to draw a direct contrast between banks of different countries. On the other hand, however, the latter method enables a direct comparison to be carried out in regard to efficiency levels and rankings across different countries (e.g. Coelli *et al*., 2005; Bos & Schmiedel, 2007) through making the implicit assumption that banks in different countries have access to the same technology and therefore can effectively compete with one another. Nonetheless, such a method requires that sample heterogeneity is managed through controlling for systematic differences between the sample that are not attributable to inefficiency, which can induce volatility in the results centred on efficiency (Bos *et al*., 2009).

3. Methodology

3.1. Introduction

The study's methodology will be applied according to four main steps: first, estimating efficiency through The Data Enveloping Analysis (DEA) approach; second, establishing Risk figures by applying three potential risk indicators; third, identifying those potential variables affecting risk and efficiency through the SUR approach; and finally, estimating risk and efficiency levels before and after the global financial crisis

The study will also apply the methodology in two different scenarios: first, with Islamic banks; and second, with conventional banks. This step is taken in order to present comparable results amongst the different banking systems, which would produce clearer, wider and more understandable findings.

3.1.1. Philosophy

Positivism is seen to align itself with the stance that only factual information garnered through observation, including measurement, may be viewed as reliable. Through such studies, the researcher adopts the role of data collector and interpreter only through an objective approach, with the findings commonly quantifiable and observable (Easterby-Smith et al. 2008)

In essence, the foundation of positivism rests on quantifiable observations that lend themselves to statistical analysis, with Collins (2010) emphasising that, as a philosophy, positivism is recognised as adhering to the empirical view that human experience leads to knowledge.

3.1.2. Deductive Research

The backbone of deductive research is the testing of theory, which is commonly associated with datasets, quantitative analysis and surveys. Such reasoning is seen to narrow its scope from more general through to more specific. It is common for such an approach to be referred to as top-down, with a thought on a theory then be narrowed into more specific hypotheses that ultimately undergo testing with the use of specific data. Collins (2010)

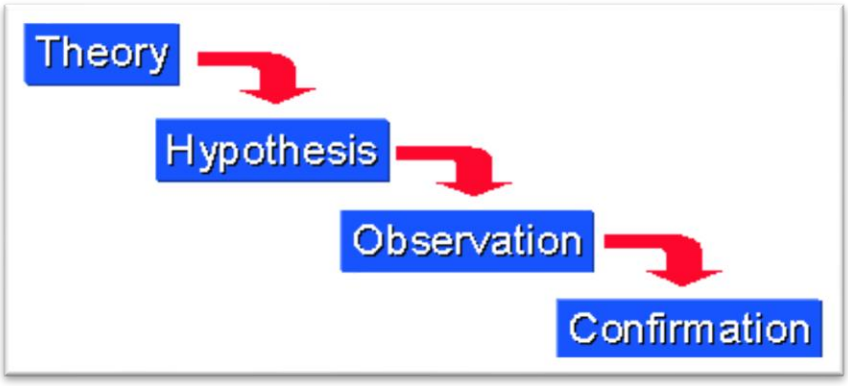

Figure 7. Methodology Sample.

Source: (Creswell, 2002).

3.1.3. Empirical Study

A work of an empirical nature might encompass statistical analysis or a type of qualitative study. Empirical research is a work making use of empirical evidence, and is well positioned in garnering knowledge through direct and indirect experiences and/or observations. In this regard, such research may apply either quantitative or qualitative analysis.

3.1.4. Quantitative Method

A quantitative approach can require substantial datasets, in addition to statistics and tables when concluding findings. Such works are made up of those studies in which the data concerned may undergo examination in terms of numbers. Quantitative research is more predominantly based on its original plans, with the results undergoing analysis and interpretation. As can be implied by the term, quantitative research is focused on the gathering and subsequent analysis of numerical data, with an emphasis commonly seen to be placed on relatively large-scale and representative sets of data, and sometimes presented or recognised as being concerned with the gathering of facts, although such a view differs between researchers (Creswell, 2002).

3.1.5. Research Questions

As discussed in the introduction section, the main objectives can be summarised as follows:

- To examine the variables affecting risk in banking systems in the MENA area

- To witness the variables affecting efficiency in banking systems in the MENA area
- To compare risk and efficiency levels between Islamic and conventional banks.
- To observe the financial crisis impact on risk and efficiency levels in both Islamic and conventional banks.

These objectives lead to three main research questions as follows:

1- Do Islamic banks experience less or more Risk levels, and are Islamic banks more or less efficient than conventional banks in the MENA area?
2- WHAT ARE the potential variables affecting Risk from one side and Efficiency on the other side in banking systems in the MENA area?
3- How were Islamic and conventional banks affected by the recent financial crisis?

3.2. Research Hypothesis

3.2.1. Risk

Generally speaking, Islamic banking systems may be recognised through consideration to different aspects that seem, on the one hand, to decrease credit risk. It is considered that lenders' religious beliefs and the greater discipline linked with higher deposit fragility could encourage loyalty whilst discouraging default. In one sense, greater credit risk could be witnessed by Islamic banks as a result of various factors, including Islamic loan contracts and their complexity, limited default penalties, and the moral hazard incentives induced as a result of PLS agreements. In specific regards insolvency risk, the link with depositors could mean Islamic banks are better positioned to bear losses; however, operational restrictions in terms of risk management and investment could mean such entities are not as stable when contrasted with conventional banking systems. Furthermore, although Islamic banking prohibits interest, such institutions are in competition with conventional banks, meaning they may be forced to offer similar pricing structures. Regardless of whether or not they demonstrate lower or higher sensitivity in comparison to conventional banks remains an empirical question, with this paper seeking to provide an answer. More specifically, this thesis directs attention to establishing whether or not banks' credit risk is less or more responsive to interest rate movements, taking into

consideration the greater risk aversion demonstrated by Islamic lenders. Furthermore, interest rate sensitivity in regards insolvency risk is also analysed.

H1: Islamic banks face greater credit risk when contrasted with conventional banking systems.

The profit or loss system can mean Islamic banks are positioned as being riskier, although larger payouts to investment account holders can ultimately mean deposits are increased, thus encouraging shareholders to raise more equity capital so as to prevent ownership rights dilution whilst maintaining capital ratios. On the other hand, poor payouts could mean withdrawals are encouraged, thereby resulting in possible liquidity issues and, as a result, solvency problems.

In Islamic banks, equity holders may face risks in terms of transferring a portion of their profits to account holders so as to decrease withdrawal-related risks. In this regard, such a risk is recognised as Displaced Commercial Risk (AAOIFI, 1999). However, should crisis be seen as likely, management may be well positioned to share losses with investment account holders in order to ensure insolvency is circumvented. This implies that Islamic banking entities may be better able to bear losses when compared with conventional banking systems. Such additional capacity depends on the weight of investment deposits in overall funding. When good performance levels are seen across Islamic banks, their profit rates may increase, albeit at a slower rate, so as to ensure deposit inflow volatility is limited.

H2: Islamic banks demonstrate greater stability when compared with conventional banking systems.

3.2.2. Efficiency

When drawing a contrast between business orientation, asset quality, cost efficiency and conventional and stability in Islamic and conventional banks, little significant difference can be seen between the groups. Although Islamic banks are known to be more cost-effective, such a benefit is seen in contrast when focusing on a sample of countries offering both Islamic and conventional banking services. Accordingly, conventional banks are seen to be more cost-effective when contrasted alongside Islamic banks, where both banks exist. Any significant difference in business

orientation, as established through the share of fee-based to toyal income or share of non-deposit in total funding, were not identified. Moreover, no notable differences were established in terms of Islamic banks' stability, although Islamic banks were recognised as having greater capital–asset ratios. Nonetheless, some degree of variation in terms of stability and efficiency in conventional banks was identified across those countries with different market shares of Islamic banks. In particular, in those regions where Islamic banks' market share is seen to be greater, there tends to be greater cost-effectiveness across conventional banks, although lesser stability (Beck *et al*, 2010)

In specific regards efficiency, it is a-priori ambiguous when considering whether greater efficiency should be seen in the case of Islamic or conventional banks. In one sense, screening and monitoring costs need to be lower for Islamic banks when considering the lower agency problems; conversely, however, Islamic banking, which goes hand-in-hand with greater complexities, could incur higher costs and therefore make Islamic banks less efficient.

H3: Islamic banks demonstrate lower or same efficiency levels when compared with conventional banks.

It was found by Donsyah (2003) that Islamic banking is more efficient when contrasted with conventional banks throughout the period of the global financial crisis (Al-samdi *et al*, 2013)

H4: Efficiency levels of Islamic banks experienced more increase compared to conventional banks after the global financial crisis when compared to conventional banks. Variables and measures

3.3. Models

3.3.1. Regression Models

LLR S = α + β1 CapitalAssetRatio + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanGrowth + β13 AssetsGrowth + β14 ReturnOnEquity + β15 NetIncome …….. (1)

LLR c = α + β1 CapitalAssetRatio + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanGrowth + β13 AssetsGrowth + β14 ReturnOnEquity + β15 NetIncome …….. (2)

NPL s = α + β1 CapitalAssetRatio + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanGrowth + β13 AssetsGrowth + β14 ReturnOnEquity + β15 NetIncome …….. (3)

NPL c = α + β1 CapitalAssetRatio + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanGrowth + β13 AssetsGrowth + β14 ReturnOnEquity + β15 NetIncome …….. (4)

Z s = α + β1 CapitalAssetRatio + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanGrowth + β13 AssetsGrowth + β14 ReturnOnEquity + β15 NetIncome …….. (5)

Z c = α + β1 CapitalAssetRatio + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanGrowth + β13 AssetsGrowth + β14 ReturnOnEquity + β15 NetIncome …….. (6)

EFF s = α α + β1 ReturnOnAssets + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanIntensity + β13 Non-PerformingLoans + β13 Non-InterestIncome + β14 Zscore…….. (7)

EFF c = α + β1 ReturnOnAssets + β2 Size + β3 LiquidAssets + β4 HHI + β7 DomesticInterestRate + β8 GDPPer-Capita + β9 GDPPer-CapitaGrowth + β10 MuslimShare + β12 LoanIntensity + β13 Non-PerformingLoans + β13 Non-InterestIncome + β14 Zscore…….. (8)

3.3.1.1. Risk Proxies

LLRij = Loan-loss reserves for bank i in country j

Zscorei *j* = *Z score* for bank i in country j

NPL *i j* = non-performing loans over total loans for bank i in country j

CAR = Equity capital to asset ratio.

ROE = Net income/ total equity

Net Income = Total profit – cost

Size = Logarithim of total assets

LAD = Liquid asset to short term deposit

Loan Growth = Annual growth rate of gross loans.

Asset Growth = Annual growth rate of total assets.

Macroeconomic pointers: Muslim Share, Domestic Interest Rate, HHI, GDP Per-Capita, and GDP Per-Capita Growth.

Muslim Share: share of the Muslim population in the total population of each country as Muslim Countries with >90% of Muslims in their population, dummy that take a value of one, and zero otherwise.

Domestic Interest Rate: Deposit Interest Rate provided by the World Bank website; for years and countries with missing observations, the data are obtained from the central bank websites.

HHI: A proxy for market concentration with a value between 0 and 1. Higher values show that the market is more concentrated.

$$H = \sum_{i=1}^{N} s_i^2$$

GDP Per-Capita: GDP Per-Capita in US$.

GDP Per-Capita Growth: Annual growth rate of GDP Per-Capita.

3.3.1.2. Efficiency Proxies

EFFij = Efficiency scores for bank i in country j (derived from DEA)

Input: (Wage Rate), (Deposits), (Physical Capital Price)

Output: (Loans), (Security)

Return on Assets (ROA) = Net income / Total asset

Size = Logarithm of total assets

LAD = Liquid asset to short term deposit

Loan Growth = Annual growth rate of gross loans.

Asset Growth = Annual growth rate of total assets.

Macroeconomic pointers: Muslim Share, Domestic Interest Rate, HHI, GDP Per-Capita, and GDP Per-Capita Growth.

Muslim Share: share of the Muslim population in the total population of each country as Muslim Countries with >90% of Muslims in their population, dummy that take a value of one, and zero otherwise.

Domestic Interest Rate: Deposit Interest Rate provided by the World Bank website; for years and countries with missing observations, the data are obtained from the central bank websites.

HHI: A proxy for market concentration with a value between 0 and 1. Higher values show that the market is more concentrated.

$$H = \sum_{i=1}^{N} s_i^2$$

GDP Per-Capita: GDP Per-Capita in US$.

GDP Per-Capita Growth: Annual growth rate of GDP Per-Capita.

Loan Intensity = Loans over total assets

Credit Risk = non-performing loans over total loans

Insolvency Risk = Z Score

(NIE) = Non-interest expenses over total assets

Various bank- and country-specific variables are included, which are recognised as describing and measuring risk in the banking system. Loan loss reserves, as one aspect of total assets (LLR), (Zscore), and (NPL) are all adopted as ways of measuring banking risk on a distinct basis. Higher reserves are seen to be indicative of a larger degree of banking risk, accounting for future negative periods. Undoubtedly, such a prediction as a measure of riskiness may be queried; however, accounting ratio such as this has been applied widely across the literature in mind of evaluating risk inclination.

Dummy Variables

Some other variables were included as dummy variables. These variables are as follows:

- Type of the bank: a dummy that take a value of 1 for Islamic banks, and 0 for conventional banks.
- Muslim Share: The share of the Muslim population in the total population of each country as Muslim Countries with >90% of Muslims in their population, dummy that take a value of 1, and 0 otherwise.

3.3.2. Independent variables

The ratio of capital asset is used because on one hand, if the equity increases, the moral hazard problems are lowered along with an increase in the banks' monitoring incentives, and on the other hand, the risk-taking capacity of the banks is enhanced by higher equity. It is inclusive of this variable because we are enabled to study the variation in the relationship between risk and equity capital between the traditional banks and the Islamic banks.

Since past researchers over the determinants of margins are suggestive of a positive relationship (Carbo and Rodriguez, 2007). It is viable to consider equity as a proxy of risk aversion (Maudos and Fernandez de Guevara, 2004; McShane and Sharpe, 1985) greater returns are expected in banks with higher equity. There can be different sorts of limitations on the Islamic banks with respect to their investment of different kinds of earning assets that can affect their stability adversely. Therefore, the net loans' share is included in the total assets of earning so that the extent of

impact of the composition of total assets of earning over the risk of insolvency can be investigated.

Clear (1992) found the impact of expansion of credit upon the rates of loan carge-off and non-performing loan rates to be negative, though research in the following years determined a positive effect. It was found that borrowers do not default as soon as they take on the loans. For the analysis of insolvency risk, as there is the need to consider the banks' growth strategy, the loan growth is used to replace total asset growth.

Lepetit et al. (2008a) demonstrate that a greater risk of insolvency is exhibited by the European banks that have higher non-interest income share in the net operating income. The other equation also includes the non-interest income's share in the total operating income as the research by Lepetit et al. (2008b) and Carbo and Rodriguez (2007) led to the conclusion that banks are enabled to lower their margins by the non-interest income.

The number of Muslims may be attracting Islamic banks and vice versa. Therefore, the share of the population of Muslims in each country is also used. The dummy variable is defined as 1 for the countries that have at least 90 per cent population of Muslims and 0 for the countries in which the shares of Muslims are less than 90 per cent.

The level of domestic rates of interest is also controlled for. The extent of rates of domestic interest may impact the risk appetite of the banks (Maddaloni and Peydro , 2011; Delis and Kouretas, 2011; Ariccia and Marquez, 2006; Borio and Zhu, 2008 and Rajan, 2006)

Particularly, when the rates of interest are low, the risk-taking appetite of the banks is greater. Nevertheless, the levels of interest rate may impact the borrowers' tendency to repay the motivation to default is greater at higher levels (Alessandri and Drehmann, 2010; Drehmann, Sorensen, and Stringa, 2010; Carling et al., 2007 and Jarrow and Turnbull, 2000).

We include the Herfindahl–Hirschman Index (HHI) in the risk model in an attempt to observe the potential effect of concentration of the banking sector on the risk taking behaviour.

We also use it in efficiency model because some authors believe there is a negative connection between *HHI* and *EFF* since in highly concentrated markets risk aversion may prevail (Sathye, 2001). Moreover, Naceur *et al*. (2009) suggest that 'greater market concentration might reduce competition and thus efficiency'. However, if economies of scale drive bank M&As, then increased concentration could lead to efficiency improvements (Demirguc-Kunt and Levine, 2000; Casu and Girardone, 2009), (Garza-Garcia, 2010).

We also include the variables of GDP Per-Capita as well as growth in it to control for the growth and level in the population's prosperity. Also in efficiency, it is expected have a relationship between *GDP* and *EFF* in a positive manner since the demand for financial services tends to raise as economies increase, increasing demand for financial services and improving the quality of loans (Garza-Garcia, 2010).

The logarithm of total asset is considered as a proxy for size (Size) in the risk model. Large banks can benefit from both scale economies and diversification as claimed by Hughes, Mester, and Moon (2001). At the same time, larger banks might be more risky, since they may try and exploit Too-Big-To-Fail safety net subsidies (Kane, 2010). It is also considered in efficiency model as Hauner (2005) explains that larger banks could pay less for their inputs than their counterparts and that there could be increasing returns to scale through the allocation of fixed costs (Abedifar, Molyneux and Tarazi, 2013).

The growth rate of gross loans (Loan Growth) is controlled for in the risk equation because a significant increase in credit could reflect weaker screening standards, tranquil collateral requirements, or lower interest rates (Dell'Ariccia and Marquez, 2006; Ogura, 2006). Clair (1992) says 'a negative effect of credit expansion on non-performing loans and loan charge-off rates, although for subsequent years a positive link is detected'. As pointed out by Berger and Udell (2004) and Foos, Norden, and Weber (2010) borrowers do not default immediately after taking-on loans. For insolvency risk analysis, the growth strategy of banks is taking into account, therefore, total asset growth (Asset Growth)is used in lieu of loan growth (Garza-Garcia, 2010).

The return on equity is used in the risk model for the reason that a company can only create shareholder value, economic profits, if the ROE is greater than its cost of

equity capital (the expected return shareholders require for investing in the company given the particular risk of the company) (Abedifar, Molyneux and Tarazi, 2013).

The return on Assets variable is used as there is an expected sign between ROA and EFF in a positive way since more efficient banks generate higher returns (Mester, 1996; Pastor et al., 1997; Carbo et al., 1999; Casu and Molyneux, 2003).

In the efficiency model we use the variable NIE which measures operating expenses across the banking sectors; the literature has found that reduced operating expenses increase the efficiency of the financial institutions (Bourke, 1989), and a negative sign is expected (Garza-Garcia, 2010).

Also in the efficiency model we use the variable NPL which captures the level of credit risk and the expected relationship with *EFF* is negative since more efficient banks have a better quality portfolio (Kwan and Eisenbeis, 1995; Resti, 1997; Bar *et al*., 2002). However, the empirical literature finds mixed evidence, Altunbas *et al*. (2000) suggests that efficiency is not very sensitive to credit risk whilst Hughes and Mester (1993) and Delis and Papanikolaou (2009) find an inverse relationship between credit risk and bank efficiency. We also use the variable Z score which proxies insolvency risk levels for the same reason (Alam, 2012)

Banks that are more liquid may be more efficient and also less exposed to risks. In the sense that all other things being equal, an efficient bank can produce more output part of which includes liquid and other assets so we account for this by using liquid assets to deposits ratio (LAD) (Abedifar, Molyneux and Tarazi, 2013).

The *loan intensity* variable reflects the lending intensity of the banking sector and a positive relationship with *EFF* is expected since loans are the main source of bank profits; however, the quality of the loans may deteriorate under some circumstances, for example during an economic recession, in which case a higher degree of loan intensity may be detrimental to bank efficiency (Garza-Garcia, 2010).

3.4. Variables and Measures

3.4.1. Risk Estimation

Previous studies like (Altunbas et al., 2007) and (Alam, N. 2012) have used one proxy (loan loss reserve) in order to measure risk. Others like (Fiordelisi et al., 2010) used two proxies (Expected default frequency and non-performing loans). We will use three different proxies to measure risk as follows in the next part. Each proxy is presented and explained at a time in analysis and discussion sections.

3.4.1.1. Loan Loss Reserves (LLR):

Loan loss reserves are accounting entries banks concerned with covering estimated losses on loans due to defaults and non-payment.

LLR = *Ratio of Loan Loss Reserves to Gross Loans.*

Loan loss reserve accounts are an important part of banks' ability to sustain losses. Such an accounting ratio has been widely used across literature in an effort to assess bank inclination towards risk.

3.4.1.2. Non-performing Loans NPL:

The Non-Performing Loans (NPL) is a widely used accounting indicator of banks' risk. The literature identifies two sets of factors to explain the evolution of NPLs over time. One group focuses on external events such as the overall macroeconomic conditions, which are likely to affect the borrowers' capacity to repay their loans, while the second group, which looks more at the variability of NPLs across banks, attributes the level of non-performing loans to bank-level factors.

NPL = non-performing loans over total loans

3.4.1.3. Altman Z Score:

The Z score provides a quantitative measurement tool able to examine the financial health of an organisation. This score provides insight into those elements contributing to the financial health of an organisation, and further identifies patterns emerging to indicate improvements or declines in the financial condition of a firm.

It is recognised that the Z score is a critical tool utilised by business managers to evaluate financial health. This assists managers in aligning their business approaches alongside capital choices of capital allocation, which helps to ensure financial condition transparency to equity capital providers and lenders. The Z score is used by managers to increase capital and accordingly secure credit, and is recognised as a valuable approach to demonstrating to investors the credit value of the business model. Z score is calculated as follows:

$$Zscore = \frac{\mathrm{E(ROA)} + \mathrm{CAR}}{\mathrm{SD(ROA)}}$$

Zscore = ROAA + CAR)/ SDROAA , where ROA stands for the assets' return, CAR represents the equity capital to assets ratio, and SD(ROAA) stands for the standard deviation of ROAA. There is an inverse relationship between Zscore and the bank's insolvency probability. When the value of assets of a bank gets less than its debt, the bank becomes insolvent. A higher value of Zscore represents higher stability of the bank. Zscore logarithm and the where E(ROA) is the expected return on assets, CAR is the ratio of equity capital to assets, and SD(ROA) is the standard deviation of ROA.

3.4.2. Efficiency Estimation

A study of efficiency usually includes estimating the efficient frontier and determining the extent of deviations from the efficient frontier by each cross-section. In order to do this, two approaches are common for the estimation. Data Enveloping Analysis (non-parametric) and the Stochastic Frontier Analysis (parametric). According to Berger and Humphrey (1997).

In specific consideration to the Data Enveloping Analysis (DEA) approach, this may be recognised as a non-parametric methodology utilising the linear programming approach. Farrell (1957) was the first to suggest such an approach; however, Charnes *et al*. (1978) went on to direct the method towards analysis. This approach adopts the foundation of economic optimalisation in regards the efficiency frontier. It is created as the piecewise linear combination; this links the observations in the series undergoing analysis, subsequently garnering a convex production possibility set. As a result, the DEA efficiency score is defined in relation to various other Decision-Making Units—notably those different from the usual absolute standard.

Accordingly, there is no requirement for the DEA to adhere to a complete specification pertaining to the underlying functional form for the relationship—a stipulation fundamental to the parametric methodology. Such a method does, however, make the assumption that, in the estimated relationship, there is no random errors, which therefore is best aligned with a balanced panel (Ncuba, 2009).

3.4.2.1. DEA as Efficiency Measurement Tool

Bank efficiency measurement involves two different approaches: intermediation and production. Whilst the former witnesses banks assuming intermediating funds between investors and savers, the latter, on the other hand, places emphasis on banks as firm-delivering services through facilitating transactions (Mostafa, 2011). Accordingly, the literature available on bank efficiency measurements utilised one of these methods.

The main function of a bank, in the case of a financial intermediary, is as an efficient enabler or financial resources through investments and financial benefits in return (Batchelor, 2005). In other words, funds are borrowed from depositors by banks with the aim of lending to others; thus, deposits may be recognised as inputs (Mester, 2003; Chen *et al*., 2008). Importantly, such an approach may be recognised as applicable to both Islamic and conventional banking structures, as shown in the subsequent two figures.

When banks are seen to perform intermediation functions and generate deposit liabilities, as a result, the level of money is influenced, with interest for both investors and depositors increasing. In line with this, there are a number of works centred on the measurement of bank efficiency through the application of DEA. Importantly, the basic CCR DEA model underwent modification through the linear programming equation in line with satisfying the need and aims of various works.

Importantly, at the very foundation of the service industry is productivity, with efficiency and effectiveness afforded much attention in this regard (Sherman & Zhu, 2006). Importantly, it is common for literature in this field to use the two terms interchangeably, with much extensive study directed towards financial institutions' efficiency during recent years. Importantly, when considering financial institutions in particular, efficiency may be seen to suggest improved profitability, a large volume of funds, better prices and improved service quality for consumers, alongside less risk

(Berger *et al*., 1993). Despite the fact that the main focus of banks is centred on identifying approaches to funds-generation, as well as lending funds at a greater rate, a number of concerns have been developed in the way in which operational productivity is managed so as to ensure attracting investors whilst also achieving higher profitability (Sherman & Zhu, 2006).

Importantly, therefore, efficiency may be recognised as the ratio of output to input (Cooper *et al*., 2006; Sherman & Zhu, 2006). Such a measurement is able to establish how organisations can achieve maximum output and profit whilst also minimising cost (Mokhtar *et al*., 2008). In this regard, the value of the efficiency measurement can be seen through its ability to facilitate management in benchmarking the performance of banks whilst recognising and highlighting areas of inefficiency for improvement (Mostafa, 2007). Importantly, inefficiency is not only restricted to considerations of poor management performance but rather could be owing to managerial, socio-economic and technological factors (Sherman & Zhu, 2006).

3.4.3. Efficiency Classifications

As noted in the study by Sherman & Zhu (2006), bank productivity as a whole ultimately rests on four individual efficiency classifications, and outlined as follows:

1. Technical efficiency: Also referred to as global efficiency, which centres on the capacity of banks to generate outputs with fewer inputs, i.e. resources.
2. Scale efficiency: Making reference to the level of optimal activity, where inefficiency may be seen should optimal levels not be achieved in the deliverance of goods or services, resulting in additional costs.
3. Price efficiency: Recognised as the capacity of banks to enhance their overall efficiency if the inputs could be secured at lower costs without compromising on quality.
4. Allocative efficiency: Referencing the measurement of the most optimum combination of inputs in an effort to create outputs focused on improving efficiency.

(Sherman & Zhu, 2006).

Moreover, in line with its definition, technical efficiency could be seen to relate to the capacity of the organisation to improve its output in line with the given inputs (Cooper *et al*., 2006). Technical inefficiency, therefore, could be witnessed in cases where banks produce additional outputs with the actual inputs or otherwise when banks produce actual output with a lesser volume of inputs (Sherman & Zhu, 2006). Importantly, as noted by Mester (2003), technical inefficiency can be witnessed when banks waste input.

Further to the aforementioned classification, efficiency may also be recognised as X-efficiency, which centres on the productivity of the bank in terms of using input to generate outputs from the point of view of choosing the most suitable inputs. From a conceptual standpoint, X-efficiency measurement may be further broken down into two individual aspects of efficiency for extended efficiency analysis, namely cost efficiency and profit efficiency, in line with the economic concept of cost-minimisation and profit-maximisation (Mester, 2003; Mensah, 2012).

Importantly, the effects of revenue and cost are considered in line with profit efficiency owing to its capacity in measuring the ration of bank profit to maximum level of profit, as seen to be achievable by efficient banks. For banks, a greater efficiency analysis can be achieved through the inclusion of risk-return trade-offs incorporation (Mester, 2003). In this regard, choosing variables for the input–output relationships and efficiency model implemented are able to establish the type of efficiency under investigation (Mostafa, 2011).

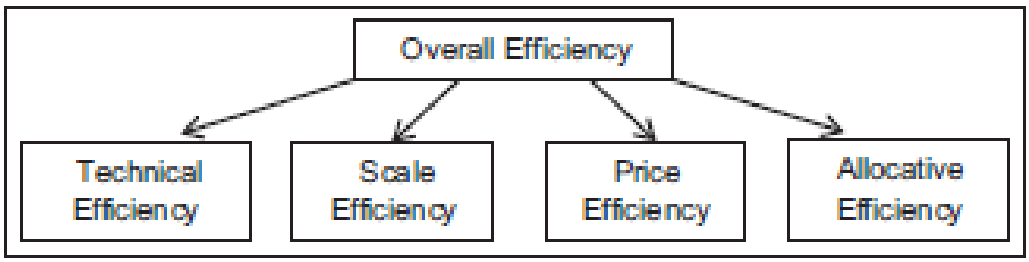

Figure 8. Bank efficiency classification.

Source: (adapted from Sherman & Zhu, 2006)

3.4.3.1. Data Envelopment Analysis (DEA) and its Basic Models

As discussed above, the DEA was first developed by Farrel (1957) and later expanded by Charnes-Cooper & Rhodes (1978) (Klimberg *et al*., 2009), and may be viewed as

a non-parametric approach making use of the linear programming to measure the level of efficiency of comparable decision-making units (DMU) through the adoption of different inputs and outputs (Klimberg *et al*., 2009).

Efficiency = Output / Input (1)

Nonetheless, such a measurement is not entirely able to represent efficiency owing to the fact that, all too often, numerous inputs are utilised in order to establish single or more outputs, thus resulting in changes to the original equation with the inclusion of multiple inputs and multiple outputs and their measurement (Zhu & Sherman, 2006). The 1978 modification was generated as a result of making changes to the original equation (Ayadi, 1998; Zhu & Sherman, 2006; Cooper *et al*., 2006).

Efficiency = Weighted sumof output / Weighted sum of input (2)

In this case, approaches to DMUs' efficiency measurement may be referred to as a group of firms under study, such as banks, for example. DEA is recognised as a valuable and sound approach to efficiency measurement when faced with a limited number of DMUs (i.e. banks) (Cooper *et al*., 2006; Klimberg *et al*., 2009; Hassan *et al*., 2009; Ahmad & Luo, 2010).

In 1984, Sherman implemented the first changes to the DEA framework; since this time, the measurement has been widely used by the banking sector across the globe with the aim of measuring the operational efficiency of such entities (Sherman & Zhu, 2006). Importantly, the DEA facilitates efficiency measurement from a number of different inputs and outputs within various DMUs (Sherman & Zhu, 2006).

As such, the mathematical equation utilised in order to establish DMUs' maximum efficiency through the use of the input–output efficiency measure may be expressed as Model 1 (Cooper *et al*., 2006; Sherman & Zhu, 2006; Ramanathan, 2007; Chen *et al*., 2008):

$$\max \frac{\sum_{j=1}^{J} v_{mj} y_{mj}}{\sum_{i=1}^{I} u_{mi} x_{mi}}$$

Such that

$$0 \leq \frac{\sum_{j=1}^{J} v_{mj} y_{nj}}{\sum_{i=1}^{I} u_{mi} x_{ni}} \leq 1; n = 1, 2, \ldots, N$$

$$v_{mj}, u_{mi} \geq 0;\ i = 1, 2, \ldots, I;\ J = 1, 2, \ldots, J \qquad \text{(Modl 1)}$$

Where:

N: Total number of DMUs

J: Weighted sum of outputs

I: Weighted sum of inputs

M: The base DMU (calculating *m*th DMU)

N: DMUs

I: Inputs

J: Outputs

*v*mj: Weights for output

*u*mi: Weights for input.

Owing to the fact that the aforementioned equation is in the fractional function, computation may be problematic; hence, CCR (1978) changes the equation into a linear programming equation. This is done by establishing the ratio's denominator to one or unity to create a linear programming equation, as shown in Model 2, commonly referred to as the output-maximisation CCR model (Cooper *et al*., 2006; Sherman & Zhu, 2006; Ramanathan, 2007; Chen *et al*., 2008):

$$\max \sum_{J=1}^{J} v_{mj} y_{mj}$$

Such that

$$\sum_{i=1}^{I} u_{mi} x_{mi=1};$$

$$\sum_{j=1}^{J} v_{mj} y_{nj} - \sum_{i=1}^{I} u_{mi} x_{ni \leq 0}; \quad n=1,2,\ldots,N$$

$$v_{mj}, u_{mi} \geq 0;\ i=1,2,\ldots,I;\ j=1,2,\ldots,J \qquad \text{(Modl 2)}$$

Upon the application of the DEA in order to measure a set of DMUs in terms of bank efficiency, the linear programming algorithm determines each DMU's efficiency in line with the input and output variables in order to determine the greatest ration of weighted sum of output I line with the weighted sum of input, which is then used as a benchmark for other DMUs; this means the best-practice DMUs can be seen on the efficient frontier line. This may be seen to infer that the best-practice units are generally efficient and may be established through the efficiency score of the DEA as 100%, i.e. as having an efficiency of 1.

The non-negativity limitations were implemented by Charnes *et al*. (1979) in an effort to ensure inputs and outputs achieve positive weight values, meaning the efficiency score assigned will rest between 1 and 0, with efficiency index no greater than 1. Those units seen to be less efficient are recognised by <100% (efficiency <1). The relative units to this frontier represent the degree of inefficiency.

The above explanations were derived from Soteriou and Stavrinides (1997), Cooper et al. (2006), Sherman and Zhu (2006), Ramanathan (2007), Chen et al. (2008), Hassan et al. (2009), Klimberg et al. (2009), and Yahya et al. (2012), (Othman et al., 2016).

3.5. Data Sources

Bank-level data were retrieved from the Bankscope database and the websites of individual banks. Country-level variables, including domestic interest rate, GDP per capita and the growth rate of GDP per capita are collected from the World Bank website. The share of Muslim population in each country is obtained from Pew Research Center (2009). The Bankscope classification for Islamic banks is

inaccurate in many banks and therefor, all banks have been cross-checked with their websites to ensure accuracy.

Across ten, our sample comprises 255 banks; 65 Islamic banks and 190 commercial banks. In all countries, both Islamic and conventional banking are authorized and practiced. The largest number of observations is from Turkey. Approximately, 25% of the total observations are for Islamic banks and the remaining 75% relate to conventional banks.

Relatively large conventional banks establish Islamic windows which are financial products and services in compliance with Sharī'ah laws. Islamic banks are, on average, more capitalized and profitable than conventional banks. The lower levels of debt (possibly as a response to higher withdrawal risk) and higher non-interest income of Islamic banks might partly explain their greater profitability. Net interest margin of Islamic banks does not appear to be significantly different from that of conventional banks; however, Islamic banks have lower implicit interest income and expense rates than conventional banks. Interestingly, the structure of the asset portfolio of Islamic banks is significantly different from that of conventional banks. Islamic banks have a higher ratio of net loans to total earning assets possibly because they are limited in their investments in other earning assets (such as bonds). Gross loans and total assets grow at higher rates for Islamic than conventional banks. The cost to income ratio of Islamic banks is slightly higher than that of conventional banks.

3.5.1. Data Collection

This study involves banks' balance sheet, income statement and annual reports data for Islamic and Conventional banking countries in the MENA area for the period 2006–2015. The data will be collected from the Bank-Scope Database, which includes banking information for both conventional and Islamic banks. The study will present breakdown by type of banking. The total number of observations will include majority of banks 'Islamic and Conventional' in the specified time frame and area. More details and breakdown will be added at a later stage of the study.

3.6. Diagnostic Tests

Pearson correlation coefficient test has been applied and results are as shown in the next chapter. Two tests have been used as diagnostic tests in order to find any multicollinearity, Tollerance and VIF).

4. Empirical Findings and Analysis

4.1. Introduction

The study results were analysed and interpreted in five ways. First, through descriptive analysis as tables show. Second, through Collinearity tests. Third, through regression results and analysis. Fourth, through the variables orders in terms of importance.

The regression variables are regressed to see the effect of independent variables (i.e. Size, Capital Asset Ratio, Return on equity, net income, Return on Assets, Size of the firm, Liquid Assets, Muslim Share, Domestic Interest Rate, HHI, GDP Per Capita, and GDP Per Capita Growth, Loan Growth Assets Growth, Loan Intensity and NIE) on dependent variables (i.e. Loan Loss Reserve, Non-Performing Loans as proxies for credit risk, Z score as proxies for insolvency risk and Efficiency scores derived from DEA as proxy for efficiency).

Regression analysis are carried out. In equations 1 and 2, loan loss reserve is used as a dependent variable to represent risk and all the independent variables are added to see their mutual effect on the dependent variable for Islamic banks and conventional banks respectively. Whereas, equations 3 and 4 non-performing loan is used as a dependent variable to represent risk and all the independent variables are added to see their mutual effect on the dependent variable for Islamic banks and conventional banks respectively. In equations 5 and 6, non-performing loan is used as a dependent variable to represent risk and all the independent variables are added to see their mutual effect on the dependent variable for Islamic banks and conventional banks respectively. In equations 7 and 8 efficiency scores derived from DEA are used as a dependent variable to represent efficiency and all the efficiency-effect independent variables are added to see their mutual effect on the dependent variable for Islamic banks and conventional banks respectively.

4.2. Risk

4.2.1. Descriptive

Banking risk was investigated using three different variables. Two are usually associated with credit risk (Loan loss reserves and non-performing loans) and one associated with insolvency risk (Z score). Therefore, the study distinguish credit from insolvency risk in our comparison.

Table 2. Descriptive Results. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	415	-3	8	3.65	2.150
NPL	261	-3	8	4.84	1.607
Z Score	499	-3	14	1.73	1.745

Table 3. Descriptive Results. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	1420	-4	9	4.40	1.961
NPL	1168	-4	9	4.68	1.821
Z Score	1419	-4	17	2.38	2.393

Credit risk in Islamic banks as shown in tables 2 and 3 had a mean of 3.65 in loan loss reserve and a mean of 4.84 in non-performing loans. While in conventional banks as shown in table 2, loan loss reserves scored a mean of 4.40 and 4.68 for non-performing loans. After comparing the means of Islamic and conventional banks, with a little higher score for Islamic banks in terms of loan loss reserve and a little higher score in conventional banks in terms of non-performing loans, the study found that no serious difference between Islamic and conventional banks was found.

Furthermore, Islamic and conventional banks experience the same level of credit risk.

On the other hand, Insolvency risk was found to be different. The study shows a better mean score in conventional banks with a mean of 1.73 in Islamic and 2.38 in Conventional banks. Furthermore, conventional banks in MENA countries for the period of 2006 to 2015 were more stable than Islamic banks in the same area and during the same period. These findings answer the first part of our first research question.

4.3. Risk presented by Loan Loss Reserve

4.3.1. Islamic Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks as shown below.

Table 4. Loan Loss Reserve as a Proxy for Risk. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	415	-3	8	3.65	2.150
Valid N (listwise)	415				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 5. Collinearity Tests for Credit Risk (LLR). Islamic Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
CAR	.363	2.753
Return on Equity ROE	.826	1.210

Net Income	.467	2.143
Size	.363	2.752
LAD	.433	2.308
Domestic Interest Rate %	.638	1.568
GDP PerCapita	.613	1.631
GDP PerCapita Growth %	.802	1.246
Muslim Share	.690	1.449
LGrowth	.305	3.279
Agrowth	.288	3.477
HHI	.613	1.631

As the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Islamic banks (see appendix).

In Islamic banks, it was found that capital assets ratio, Size and GDP per capita are significant at 1% significance level, also Liquid assets are significant at 5% significance level. GDP Per Capita Growth were found to be significant at 10% significance level.

As for the regression results in Islamic banks (see appendix), The R squared is certainly significant (.706) which means that about 71% of changes in risk levels variable can be explained by the regression. Also in model 1, there was a significant effect of the independent variables on risk, ($F = 46.877$, $p < .005$).

Independent variables like Capital Assets ratio, Net income, GDP per capita, GDP per capita growth, Loan growth and Assets growth were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Return on equity, Size, Liquid assets, Domestic interest rate, Muslim shares and Market concentration to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variable increase and vice versa.

Table 6. Significance Levels for Credit Risk (LLR). Islamic Banks

	t	Sig.
(Constant)	-8.227	.000
CAR	-3.684	.000
Return on Equity ROE	.078	.938
Net Income	-1.000	.318
Size	14.106	.000
LAD	2.980	.003
Domestic Interest Rate %	.672	.502
GDP PerCapita	-5.336	.000
GDP PerCapita Growth %	-1.763	.079
Muslim Share	1.470	.143
LGrowth	-.196	.845
Agrowth	-.563	.574
HHI	1.139	.256

On a relative scale, the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 7. Beta Results for Credit Risk (LLR). Islamic Banks

	Beta
(Constant)	-6.478
CAR	-2.943
Return on Equity ROE	.029
Net Income	.000
Size	1.327
LAD	.441
Domestic Interest Rate %	.010
GDP PerCapita	-2E-05
GDP PerCapita Growth %	-.025

Muslim Share	.232
LGrowth	-8E-06
Agrowth	-2E-05
HHI	7.644

Table 8. Credit (LLR) Risk. Islamic Banks

Most Significant	Least Significant
CAR	GDP PerCapita Growth %
Size	
GDP PerCapita	

Only Capital Assets Ratio, Size of the firm and GDP Per Capita are the statistically significant predictor variables that cannot be left out from the multiple regressions under any circumstances.

4.3.2. Conventional Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks as shown below.

Table 9. Loan Loss Reserve as a Proxy for Risk. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	1420	-4	9	4.40	1.961
Valid N (listwise)	1420				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 10. Collinearity Tests for Credit Risk (LLR). Conventional Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
CAR	.708	1.413
Return on Equity ROE	.947	1.056
Net Income	.421	2.375
Size	.351	2.850
LAD	.994	1.006
Domestic Interest Rate %	.665	1.504
GDP PerCapita	.694	1.441
GDP PerCapita Growth %	.769	1.300
Muslim Share	.670	1.492
LGrowth	.309	3.233
Agrowth	.303	3.306
HHI	.733	1.364

The study found that as the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Conventional banks (see appendix).

In Conventional banks, it was found that Size, Domestic interest rate, GDP per capita and Muslim shares are significant at 1% significance level. Also, Returnon equity and GDP per capita growth are significant at 5% significance level. Assets growth were found to be significant at 10% significance level.

As for the regression results in Conventional banks (see appendix), The R squared is certainly significant (.734) which means that about 74% of changes in risk levels variable can be explained by the regression. Also in model 2, there was a significant effect of the independent variables on risk, (F = 267.690, p < .005).

Independent variables like Capital assets ratio, Return on equity, Liquid Assets, Domestic interest rate, GDP per capita, GDP per capita growth, Assets growth and

Market concentration were found to be affecting the dependent variable of risk in an opposite manner. Therefore, the study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Net income, Size, Muslim shares and Loan growth to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variable increase and vice versa.

Table 11. Collinearity Tests for Credit Risk (LLR). Conventional Banks

	t	Sig.
(Constant)	-12.913	.000
CAR	-1.313	.189
Return on Equity ROE	-3.427	.001
Net Income	.487	.626
Size	33.966	.000
LAD	-.078	.938
Domestic Interest Rate %	-8.322	.000
GDP PerCapita	-7.444	.000
GDP PerCapita Growth %	-3.021	.003
Muslim Share	6.032	.000
LGrowth	1.128	.260
Agrowth	-2.239	.025
HHI	-1.267	.206

On a relative scale, the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 12. Beta Results for Credit Risk (LLR). Conventional Banks

	Beta
(Constant)	-3.247
CAR	-.331

Return on Equity ROE	-.259
Net Income	4.7E-05
Size	.957
LAD	-1.8E-05
Domestic Interest Rate %	-.042
GDP PerCapita	-1.2E-05
GDP PerCapita Growth %	-.022
Muslim Share	.524
LGrowth	1.3E-05
Agrowth	-1.8E-05
HHI	-1.574

Table 13. Credit (LLR) Risk. Conventional Only

Most Significant	Least Significant
Size	Agrowth
Domestic Interest Rate %	
GDP PerCapita	
Muslim Share	

Only Size of the firm, Domestic Interest Rate, GDP Per Capita and Muslim Share are the statistically significant predictor variables that cannot be left out from the multiple regressions under any circumstances.

In conclusion of equation 1 and 2, the study identifies the variables with most influence on Risk in Islamic banks which are Capital Assets Ratio, Size, Liquid Assets, GDP Per Capita and GDP Per Capita Growth were the most influential factors on Risk in Islamic banks.

On the other hand, variables like Return on Equity, Size of the firm, Domestic Interest Rate, GDP Per Capita, GDP Per Capita Growth, Muslim Share and Assets Growth were the least influential factors on Risk levels in Conventional banks.

4.4. Risk presented by Non-Performing Loans

4.4.1. Islamic Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks as shown below.

Table 14. Non-performing Loans as a Proxy for Risk. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NPL	261	-3	8	4.84	1.607
Valid N (listwise)	261				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 15. Collinearity Tests for Credit Risk (NPL). Islamic Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
CAR	.372	2.692
Return on Equity ROE	.837	1.195
Net Income	.441	2.266
Size	.340	2.944
LAD	.428	2.338

Domestic Interest Rate %	.597	1.674
GDP PerCapita	.581	1.722
GDP PerCapita Growth %	.852	1.174
Muslim Share	.698	1.433
LGrowth	.324	3.084
Agrowth	.305	3.282
HHI	.580	1.725

As the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Islamic banks (see appendix).

In Islamic banks, it was found that Size is significant at 1% significance level. Also, Capital assets ratio, GDP per capita and Market concentration are significant at 5% significance level. Liquid assets and Muslim shares were found to be significant at 10% significance level.

As for the regression results in Islamic banks (see appendix), The R squared is certainly significant (.555) which means that about 56% of changes in risk levels variable can be explained by the regression. Also in model 3, there was a significant effect of the independent variables on risk, ($F = 21.719$, $p < .005$).

Independent variables like Capital assets ratio, Return on equity, Net income, GDP per capita, Muslim shares, Loan growth and Assets growth were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Size, Liquid assets, Domestic interest rate, GDP per capita and Market concentration to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variable increase and vice versa.

Table 16. Significance Levels for Credit Risk (NPL). Islamic Banks

	t	Sig.
(Constant)	-2.474	.014
CAR	-3.513	.001
Return on Equity ROE	-.339	.735
Net Income	-.586	.558
Size	7.608	.000
LAD	1.698	.091
Domestic Interest Rate %	.610	.543
GDP PerCapita	-3.471	.001
GDP PerCapita Growth %	.520	.604
Muslim Share	-1.687	.093
LGrowth	-.177	.859
Agrowth	-.204	.839
HHI	3.349	.001

On a relative scale, the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 17. Beta Results for Credit Risk (NPL). Islamic Banks

	Beta
(Constant)	-2.734
CAR	-4.641
Return on Equity ROE	-.153
Net Income	.000
Size	.977
LAD	.366
Domestic Interest Rate %	.011
GDP PerCapita	-1.3E-05

GDP PerCapita Growth %	.009
Muslim Share	-.321
LGrowth	-8.3E-06
Agrowth	-7.0E-06
HHI	26.182

Table 18. Credit (NPL) Risk. Islamic Only

Most Significant	Least Significant
Size	LAD
	Muslim Share

Only Size of the firm is the statistically significant predictor variable that cannot be left out from the multiple regressions under any circumstances.

4.4.2. Conventional Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks as shown below.

Table 19. Non-performing Loans as a Proxy for Risk. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NPL	1168	-4	9	4.68	1.821
Valid N (listwise)	1168				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 20. Collinearity Tests for Credit Risk (NPL). Conventional Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
CAR	.721	1.387
Return on Equity ROE	.936	1.069
Net Income	.405	2.470
Size	.344	2.905
LAD	.994	1.006
Domestic Interest Rate %	.629	1.590
GDP PerCapita	.703	1.422
GDP PerCapita Growth %	.776	1.288
Muslim Share	.677	1.476
LGrowth	.306	3.268
Agrowth	.299	3.344
HHI	.738	1.354

When can say that as the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Islamic banks (see appendix).

In Conventional banks, it was found that Size, Domestic interest rate, GDP per capita and Muslim shares are significant at 1% significance level. Also, Return on equity and GDP per capita growth are significant at 5% significance level. Assets growth was found to be significant at 10% significance level.

As for the regression results in Conventional banks (see appendix), The R squared is certainly significant (.637) which means that about 64% of changes in risk levels variable can be explained by the regression. Also in model 4, there was a significant effect of the independent variables on risk, (F = 147.503, p < .005).

Independent variables like Capital assets ratio, Return on equity, Domestic interest rate, GDP per capita, GDP per capita growth, Assets growth and Market concentration were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, Net income, Size, Liquid assets, Muslim shares and Loan growth to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variables increase and vice versa.

Table 21. Significance Levels for Credit Risk (NPL). Conventional Banks

	T	Sig.
(Constant)	-7.373	.000
CAR	-.821	.412
Return on Equity ROE	-2.824	.005
Net Income	.482	.630
Size	24.833	.000
LAD	.129	.897
Domestic Interest Rate %	-6.937	.000
GDP PerCapita	-6.752	.000
GDP PerCapita Growth %	-2.828	.005
Muslim Share	4.344	.000
Lgrowth	.731	.465
Agrowth	-1.979	.048
HHI	-1.258	.209

On a relative scale the value of beta (β) explains the contribution of independent variable within dependent variable. See table below

Table 22. Beta Results for Credit Risk (NPL). Conventional Banks

	Beta
(Constant)	-2.285
CAR	-.255
Return on Equity ROE	-.261
Net Income	5.5E-05
Size	.858
LAD	3.4E-05
Domestic Interest Rate %	-.042
GDP PerCapita	-1.3E-05
GDP PerCapita Growth %	-.024
Muslim Share	.445
LGrowth	9.3E-06
Agrowth	-1.8E-05
HHI	-1.802

Table 23. Credit (NPL) Risk. Conventional Only

Most Significant	Least Significant
Size	Agrowth
Domestic Interest Rate %	
GDP PerCapita	
Muslim Share	

Only Size of the firm, Domestic Interest Rate, GDP Per Capita and Muslim Share are the statistically significant predictor variables that cannot be left out from the multiple regressions under any circumstances.

In conclusion of equations 3 and 4, the study identifies the variables with most influence on Risk in Islamic banks which are Capital Assets Ratio, Size of the firm, Liquid Assets, GDP Per Capita, Muslim Share and HHI were the most influential factors on Risk in Islamic banks.

On the other hand, variables like Return on Equity, Size of the firm, Domestic Interest Rate, GDP Per Capita, GDP Per Capita Growth, Muslim Share and Assets Growth were the least influential factors on Risk levels in Conventional banks.

4.5. Risk presented by Z score

4.5.1. Islamic Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks as shown below.

Table 24. Z Score as a Proxy for Risk. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Z Score	499	-3	14	1.73	1.745
Valid N (listwise)	499				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 25. Collinearity Tests for Insolvency Risk. Islamic Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
CAR	.293	3.410

Return on Equity ROE	.715	1.400
Net Income	.432	2.313
Size	.339	2.954
LAD	.368	2.719
Domestic Interest Rate %	.609	1.643
GDP PerCapita	.637	1.570
GDP PerCapita Growth %	.822	1.217
Muslim Share	.623	1.606
LGrowth	.300	3.335
Agrowth	.283	3.539
HHI	.620	1.612

As the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Islamic banks (see appendix).

In Islamic banks, it was found that Return on equity are significant at 1% significance level. Also, Muslim shares are significant at 5% significance level. Market concentration are significant at 10% significance level.

As for the regression results in Islamic banks (see appendix), The R squared is certainly significant (.290) which means that about 30% of changes in risk levels variable can be explained by the regression. Also in model 5, there was a significant effect of the independent variables on risk, ($F = 8.831$, $p < .005$).

Independent variable like Capital assets ratio, Loan growth, Assets growth and Market concentration were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Return on equity, Net income, Size, Liquid assets, Domestic interest rate, GDP per capita, GDP per capita growth and Muslim shares to be affecting the

dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variable increase and vice versa.

Table 26. Significance Levels for Insolvency Risk. Islamic Banks

	t	Sig.
(Constant)	-.760	.448
CAR	-1.341	.181
Return on Equity ROE	4.931	.000
Net Income	1.286	.200
Size	1.336	.183
LAD	1.413	.159
Domestic Interest Rate %	1.021	.308
GDP PerCapita	1.001	.318
GDP PerCapita Growth %	.156	.876
Muslim Share	2.898	.004
LGrowth	-.018	.986
Agrowth	-.356	.722
HHI	-2.297	.023

On a relative scale the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 27. Beta Results for Insolvency Risk. Islamic Banks

	Beta
(Constant)	-.949
CAR	-1.599
Return on Equity ROE	4.318
Net Income	.001
Size	.201

LAD	.309
Domestic Interest Rate %	.027
GDP PerCapita	5.4E-06
GDP PerCapita Growth %	.004
Muslim Share	.761
LGrowth	-1.2E-06
Agrowth	-1.8E-05
HHI	-25.7

Table 28. Insolvency Risk. Islamic Only

Most Significant	Least Significant
Return on Equity ROE	HHI

Only Return on Equity is the statistically significant predictor variable that cannot be left out from the multiple regressions under any circumstances.

4.5.2. Conventional Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks as shown below.

Table 29. Z Score as a Proxy for Insolvency Risk. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Z Score	1419	-4	17	2.38	2.393
Valid N (listwise)	1419				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF)

Table 30. Collinearity Tests for Insolvency Risk. Conventional Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
CAR	.682	1.466
Return on Equity ROE	.937	1.067
Net Income	.422	2.372
Size	.340	2.941
LAD	.995	1.005
Domestic Interest Rate %	.617	1.621
GDP PerCapita	.690	1.449
GDP PerCapita Growth %	.771	1.298
Muslim Share	.640	1.562
LGrowth	.296	3.376
Agrowth	.290	3.449
HHI	.742	1.347

When can say that as the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Islamic banks (see appendix).

In Conventional banks, it was found that Return on equity, Net income and GDP per capita are significant at 1% significance level. Also, Muslim shares are significant at 5% significance level. Capital assets ratio, Size and GDP per capita growth were found to be significant at 10% significance level.

As for the regression results in Conventional banks (see appendix), The R squared is significant at (.195) which means that about 20% of changes in risk levels variable can be explained by the regression. Also in model 6, there was a significant effect of the independent variables on risk, (F = 22.080, p < .005).

Independent variables like Capita assets ratio, Liquid assets and Loan growth were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Return on equity, Net income, Size, Domestic interest rate, GDP per capita, GDP per capita growth, Muslim shares, Assets growth and Market concentration to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variable increase and vice versa.

Table 31. Significance Levels for Insolvency Risk. Conventional Banks

	t	Sig.
(Constant)	.818	.413
CAR	-1.837	.066
Return on Equity ROE	4.610	.000
Net Income	5.145	.000
Size	1.851	.064
LAD	-1.197	.232
Domestic Interest Rate %	.537	.591
GDP PerCapita	6.222	.000
GDP PerCapita Growth %	2.007	.045
Muslim Share	2.703	.007
LGrowth	-.817	.414
Agrowth	.434	.664
HHI	.817	.414

On a relative scale the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 32. Beta Results for Insolvency Risk. Conventional Banks

	Beta
(Constant)	.467
CAR	-1.027
Return on Equity ROE	.888
Net Income	.001
Size	.120
LAD	-.001
Domestic Interest Rate %	.006
GDP PerCapita	2.5E-05
GDP PerCapita Growth %	.034
Muslim Share	.540
LGrowth	-2.2E-05
Agrowth	8.4E-06
HHI	2.471

Table 33. Insolvency Risk. Conventional Only

Most Significant	Least Significant
Return on Equity ROE	CAR
Net Income	Size
GDP PerCapita	GDP PerCapita Growth %

Only Return on Equity, Net Income and GDP Per Capita are the statistically significant predictor variables that cannot be left out from the multiple regressions under any circumstances.

In conclusion of equations 5 and 6, the study identifies the variables with most influence on Risk in Islamic banks which are Return on Equity, Muslim Share and HHI were the most influential factors on Risk in Islamic banks.

On the other hand, variables like Capital Assets Ratio, Return on Equity, Net Income, Size of the firm, GDP Per Capita, GDP Per Capita Growth and Muslim Share were the least influential factors on Risk levels in Conventional banks.

In conclusion of equations 1 – 6 and after using three different proxies to measure risk levels. The study can now answer the first research question "*What are the variables that affect risk".*

Credit risk in Islamic banks is positively affected by Size of the firm, Liquid Assets, HHI. While Credit risk in Islamic banks is negatively affected by Capital Assets Ratio, GDP Per Capita, GDP Per Capita Growth and Muslim Share.

On the other hand, Credit risk in Conventional Banks is positively affected by Size of the firm, Muslim Share and Assets Growth. While Credit risk in conventional banks is negatively affected by Return on Equity, Domestic Interest Rate, GDP Per Capita and GDP Per Capita Growth.

Insolvency risk in Islamic banks is affected by Return on Equity, Muslim Share and HHI with a positive impact only.

Insolvency risk in conventional banks is positively affected by Return on Equity, Net Income, Size of the firm, GDP Per Capita, GDP Per Capita Growth and Muslim Share. While; Capital Assets Ratio was the only significant variable with a negative effect on insolvency risk in conventional banks.

4.6. Efficiency

4.6.1. Descriptive

When compared the efficiency scores in Islamic and conventional banks, the study found as shown in tables 32 and 33 that the mean for Islamic banks was similar to

the mean in conventional banks. With almost no difference, the study found that Islamic banks in the MENA area for the period of 2006 to 2015 were as efficient as conventional banks. These findings answer the second part of our first research question.

Table 34, Descriptive Results. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	650	.0000000	1.00000	.56	.741

Table 35. Descriptive Results. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	1900	.0000000	1.00000	.5693	.38340248

4.7. Efficiency presented by DEA scores

4.7.1. Islamic Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks as shown below.

Table 36. Efficiency Scores as a proxy for Efficiency. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	650	.00	1.00	.5619	.41027
Valid N (listwise)	650				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 37. Collinearity Tests for Efficiency. Islamic Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
ROA	.733	1.363
Size	.472	2.120
LAD	.857	1.167
Domestic Interest Rate %	.537	1.861
GDP PerCapita	.656	1.523
GDP PerCapita Growth %	.860	1.163
Muslim Share	.648	1.544
HHI	.542	1.846
LoanIntensity	.783	1.277
CRNPL	.765	1.307
NIE	.643	1.554
Z Score	.690	1.449

As the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Islamic banks (see appendix).

In Islamic banks, it was found that Market concentration is significant at 5% significance level. Domestic interest rate, GDP per capita growth, Muslim shares, Non-performing and Z scores were found to be significant at 10% significance level.

As for the regression results in Islamic banks (see appendix), The R squared is significant at (.129) which means that about 13% of changes in risk levels variable can be explained by the regression. Also in model 7, there was a significant effect of the independent variables on risk, (F = 3.360, p < .005).

Independent variables like Size, Liquid assets, GDP per capita, Muslim shares and NIE were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Return on assets, Domestic interest rate, GDP per capita growth, Market concentration, Loan intensity, non-performing loans and Z scores to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these.

Table 38. Significance Levels for Efficiency. Islamic Banks

	t	Sig.
(Constant)	16.663	.000
ROA	.557	.578
Size	-.776	.439
LAD	-.225	.822
Domestic Interest Rate %	2.002	.047
GDP PerCapita	-1.489	.138
GDP PerCapita Growth %	2.068	.040

Muslim Share	-2.198	.029
HHI	3.067	.002
LoanIntensity	.959	.339
CRNPL	2.150	.033
NIE	-1.560	.121
Z Score	2.115	.036

On a relative scale the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 39. Beta Results for Efficiency. Islamic Banks

	Beta
(Constant)	.979
ROA	.161
Size	-.005
LAD	-.001
Domestic Interest Rate %	.002
GDP PerCapita	-3.4E-07
GDP PerCapita Growth %	.002
Muslim Share	-.026
HHI	1.523
LoanIntensity	.027
CRNPL	.140
NIE	-.625
Z Score	.006

Table 40. Efficiency. Islamic Only

Most Significant	Least Significant
HHI	Domestic Interest Rate %

	GDP PerCapita Growth %
	CRNPL
	Z Score

Only HHI is the statistically significant predictor variable that cannot be left out from the multiple regressions under any circumstances.

4.7.2. Conventional Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks as shown below.

Table 41. Efficiency Scores a proxy for Efficiency. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	1900	.000000000 0000000	1.00000000 00000000	.569381071 736843	.383402483 964910
Valid N (listwise)	1900				

As for correlations, Pearson correlation coefficient test has been applied and results are as shown in the table below. Two tests have been used as diagnostic tests in order to find any multiCollinearity (Tollerance and VIF).

Table 42. Collinearity Tests for Efficiency. Conventional Banks

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
ROA	.919	1.089
Size	.699	1.431
LAD	.993	1.007

Domestic Interest Rate %	.563	1.776
GDP PerCapita	.691	1.448
GDP PerCapita Growth %	.777	1.287
Muslim Share	.659	1.518
HHI	.764	1.309
LoanIntensity	.808	1.238
CRNPL	.886	1.128
NIE	.940	1.064
Z Score	.842	1.187

When can say that as the standard benchmark figures were mainly above 0.2 for tolerance and below 7 for VIF, then the study found that no serious multiCollinearity was found among the dependent variables in Conventional banks (see appendix).

In Conventional banks, it was found that Size and Loan intensity are significant at 1% significance level. Also, Market concentration and Non-performing loans are significant at 5% significance level. Domestic interest rate, Muslim shares and Z scores are significant at 10% significance level.

As for the regression results in Conventional banks (see appendix), The R squared is significant at (.328) which means that about 33% of changes in risk levels variable can be explained by the regression. Also in model 8, there was a significant effect of the independent variables on risk, (F = 36.427, p < .005).

Independent variables like Liquid assets, Domestic interest rate and Loan intensity were found to be affecting the dependent variable of risk in an opposite manner. The study found that the dependent variable increases when the values of these independent variables decrease and vice versa. On the other hand, the study found Return on assets, Size, GDP per capita, GDP per capita growth, Muslim shares, Market concentration, non-performing loans, NIE and Z scores to be affecting the dependent variable of risk in a positive manner. The dependent variable increases when the values of these independent variable increase and vice versa.

Table 43. Significance Levels for Efficiency. Conventional Banks

	t	Sig.
(Constant)	61.358	0.000
ROA	1.391	.164
Size	13.165	.000
LAD	-.957	.339
Domestic Interest Rate %	-1.797	.073
GDP PerCapita	.412	.681
GDP PerCapita Growth %	1.135	.257
Muslim Share	2.508	.012
HHI	3.113	.002
LoanIntensity	-7.434	.000
CRNPL	3.430	.001
NIE	.962	.336
Z Score	2.278	.023

On a relative scale the value of beta (β) explains the contribution of independent variable within dependent variable. See table below.

Table 44. Beta Results for Efficiency. Conventional Banks

	Beta
(Constant)	.781
ROA	.100
Size	.018
LAD	-1.4E-05
Domestic Interest Rate %	-.001
GDP PerCapita	4.719E-08
GDP PerCapita Growth %	.001
Muslim Share	.015

HHI	.254
LoanIntensity	-.076
CRNPL	.004
NIE	.008
Z Score	.002

Table 45. Efficiency. Conventional Only

Most Significant	Least Significant
Size	Domestic Interest Rate %
LoanIntensity	Muslim Share
	Z Score

Only Size of the firm and Loan Intensity are the statistically significant predictor variables that cannot be left out from the multiple regressions under any circumstances.

The study identifies the variables with most influence on efficiency in Islamic banks which include; Domestic Interest Rate, GDP Per Capita, Muslim Share, HHI, Non-performing Loans and Z Score.

On the other hand, variables like Size of the firm, Domestic Rate, Muslim Share, HHI, Loan Intensity, Non-performing Loans and Z Scores were the most influential factors on efficiency levels in Conventional banks.

In conclusion of equations 7 and 8 and after running the models to determine the effect on efficiency levels, the study can now answer the second research question "*What are the variables that affect efficiency".*

In Islamic banks; Domestic Interest Rate, GDP Per Capita, HHI, Non-performing Loans and Z Score were found to have a positive effect on efficiency. While; Muslim Share was found to be negatively impacting efficiency.

In conventional banks; Size of the firm, Muslim Share, HHI, Non-performing Loans and Z Score had a positive impact on efficiency. While; Domestic Interest Rate and Loan Intensity were found to have a negative impact on efficiency

4.8. Financial Crisis Impact

4.8.1. Risk

4.8.1.1. 4.8.1.1 Islamic Banks Before or During

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks before or during the financial crisis as shown in the table below.

Table 46. Risk Before or During Financial Crisis. Islamic only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	167	-2	8	3.57	2.124
NPL	92	-3	8	4.69	1.747
Z Score	214	-2	7	1.83	1.690
Valid N (listwise)	77				

4.8.1.2. Islamic Banks After

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks after the financial crisis as shown in the table below.

Table 47. Risk After Financial Crisis. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	248	-3	8	3.71	2.170

NPL	169	1	8	4.91	1.526
Z Score	282	-3	14	1.68	1.787
Valid N (listwise)	141				

4.8.1.3. Conventional Banks Before or During

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks before or during the financial crisis as shown in the table below.

Table 48. Risk Before or During Financial Crisis. Conventional only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR	654	-4	9	4.29	1.936
NPL	495	-4	9	4.55	1.768
Z Score	652	-4	17	2.61	2.408
Valid N (listwise)	431				

4.8.1.4. Conventional Banks After

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks after the financial crisis as shown in the table below.

Table 49. Risk After Financial Crisis. Conventional only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	771	-3	9	4.49	1.974

NPL	673	-3	9	4.77	1.854
Z Score	756	-3	16	2.21	2.366
Valid N (listwise)	549				

4.8.2. Efficiency

4.8.1.2. Islamic Banks Before or During

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks before or during the financial crisis as shown in the table below.

Table 50. Efficiency Before or During Financial Crisis. Islamic only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	330	.00	1.0000	0.43098	418495854973209.50000
Valid N (listwise)	330				

4.8.1.3. Islamic Banks After

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks after the financial crisis as shown in the table below.

Table 51. Efficiency After Financial Crisis. Islamic only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	325	.00	1.0000	0.6938	436329823197748.50000
Valid N (listwise)	325				

4.8.1.4. Conventional Banks Before or During

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks before or during the financial crisis as shown in the table below.

Table 52. Efficiency Before or During Financial Crisis. Conventional only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	955	.00000	1.0000	0.4956	.406294591020619
Valid N (listwise)	955				

4.8.1.5. Conventional Banks After

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for conventional banks. Mean, standard deviation, maximum, minimum. These are the values of conventional banks after or during the financial crisis as shown in the table below.

Table 53. Efficiency After Financial Crisis. Conventional only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Effeciency Scores	950	.00000	1.0000	0.6434	.3430289185
Valid N (listwise)	950				

4.9. Geographic Distribution

The sample is divided into two parts. The first part “GCC” which includes Saudi Arabia, Qatar, Kuwait, Bahrain and United Arab Emirates. The second part “MENA” which includes Egypt, Turkey, Tunisia, Jordan and Sudan.

4.9.1. GCC, Islamic Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks before or during the financial crisis as shown in the table below.

Table 54. Descriptive Analysis. GCC, Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	223	-2	8	4.56	1.907
LnNPL	196	-3	8	4.91	1.747
Z Score	286	-3	14	1.45	1.822
Effeciency Scores	350	.00	8.17	.6271	.93857
Valid N (listwise)	175				

4.9.2. GCC, Conventional Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks before or during the financial crisis as shown in the table below.

Table 55. Descriptive Analysis. GCC, Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	475	-2	9	4.96	1.883
LnNPL	461	-2	9	4.97	1.765
Z Score	561	-3	17	2.45	2.693
Effeciency Scores	650	.00000000000	1.0000000000	.62095816000	.37991041700
Valid N (listwise)	419				

4.9.3. Mena, Islamic Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks before or during the financial crisis as shown in the table below.

Table 56. Descriptive Analysis. MENA, Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	192	-3	6	2.60	1.933
LnNPL	65	1	7	4.61	1.062
Z Score	213	-2	12	2.12	1.561
Effeciency Scores	300	.00	1.00	.4858	.39195
Valid N (listwise)	44				

4.9.4. Mena, Conventional Banks

For the descriptive analysis; the table below displays descriptive statistics of the instructive variables for Islamic banks. Mean, standard deviation, maximum, minimum. These are the values of Islamic banks before or during the financial crisis as shown in the table below.

Table 57. Descriptive Analysis. MENA, Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	947	-4	8	4.13	1.944
LnNPL	708	-4	8	4.49	1.833
Z Score	859	-4	15	2.33	2.174
Effeciency Scores	1252	.00000000000	1.0000000000	.54249299700	.38283734900
Valid N (listwise)	567				

4.10. Sammury

This chapter has provided in details all the model results starting with descriptive analysis, collinearity tests, regression results and potential financial aspects with possible effects on credit risk, insolvency risk and Efficiency in both Islamic and conventional banks.

The results in this chapter can provide answers to the study's hypothesis, the study has found that hypothesis are as follows:

Hypothesis 1: Islamic banks face greater credit risk when contrasted with conventional banking systems is rejected.

Hypothesis 2: Islamic banks demonstrate greater stability when compared with conventional banking systems is rejected.

Hypothesis 3: Islamic banks demonstrate lower or same efficiency levels when compared with conventional banks is approved.

Hypothesis 4: Efficiency levels of Islamic banks experienced more increase than conventional banks after the global financial crisis when compared to conventional banks is approved.

5. Discussion

5.1. Introduction

This chapter discusses the models results as follows; first, discusses the impact of potential variable affecting risk. Second, debates the influence of possible variable affecting efficiency. Third, discusses the impact of the global financial crisis on risk and efficiency.

5.2. Risk

Size of the firm along with Muslim shares were found to be significant aspects in risk models. The study found that size of the firm always affects the level of risk in a positive way, as risk arises along with a rise in firm size. The study also found that there was no difference between Islamic and conventional banks. Jensen (1986) argues that Managers seem to maximise their own levels of implicit and explicit compensation to the detriment of shareholders, especially when they are risk-averse. Owing to the fact that both power and managerial compensation are commonly associated with the growth of organisations and with larger business size, there may be the tendency amongst management to maximise business growth beyond efficient size. These findings are fully consistent with literature like Hughes, Mester, and Moon (2001), who claimed that Large banks could benefit from both scale economies and diversification. (Kane, 2010) also reports that, larger banks might be riskier, since they may try and exploit Too-Big-To-Fail safety net subsidies.

Banks' size played an important role on the level of risk. Larger banks showed higher levels of risk and this could be a result of less control level. Muslim share was also an important aspect as countries with high Muslim shares experienced a higher level of risk. The positive association of Muslim share with risk means that banks performing in such countries whether Islamic or conventional, experience a risk of religious causes as higher share of Muslim would require higher Sharī'ah' compliance whether through Islamic banks or conventional banks with Islamic window.

Liquid Assets results were found to be also affecting risk levels in a positive manner in both Islamic and conventional banks. This can be explained by (Kwan &

Eisenbeis, 1995) who argue that it is also highlighted by theory that, between risk-related premiums in the control of moral hazard behaviour and those capital standards aimed at risk-taking limitation, there is an isomorphism. Upon understanding of the correspondence between bank capital requirements and risk-based premiums, there was an ever-growing concern expressed to suggest that institutions might be encouraged to take on a greater degree of risk in order to offset higher capital requirements because of increases in regulatory capital requirements; unquestionably, institutions should be operating in a safer, sounder manner.

Liquid assets in banks increased the level of risk. No difference was found between Islamic and conventional banks. This shows that banks intend to take on greater risks in order to offset higher capital requirements as a result of increase in regulatory capital requirements. The similar results between Islamic and conventional are expected, simply because liquid assets under Sharī‘ah’ compliance regulations require the same basic banking regulations. Therefore, no different outcomes are expected

Environmental factors like GDP Per Capita were observed to have a negative impact on Risk. This of course is consistent with previous studies and literature as reported by Richard et al. (2008), who argues that Banks’ credit risk can be influenced by the environmental factors in which banks perform. The same negative impact was found on conventional banks.

Risk was also affected by GDP Per Capita, as banks’ credit risk showed higher levels with low GDP Per Capita. These findings are expected, simply because previous studies have reported that banks credit risk is influenced by such enviourmental factors. Also, and as expected that no difference was found in terms of Islamic banking simply because GDP Per Capita do not involve changes based on Sharī‘ah’ compliance.

Other environmental factors like domestic interest rates were investigated and the study found that the credit risk of Islamic banks was not significantly sensitive to domestic interest rates. These results are consistent with (Abedifar, Molyneux and Tarazi, 2013) who found that there was no significant relationship between credit risk and domestic interest rate in Islamic banks. However, a negative impact of domestic interest rates was found in conventional banks. This is also consistent with same

study of (Abedifar, Molyneux and Tarazi, 2013) as they found an impact of domestic interest rate on credit risk. However, the impact level is different in our study.

On the other hand, other enviourmental factors like domestic interest rates have influenced risk in conventional banks. This is expected as Sharī‘ah’ compliance does not approve interest-based loans. Moreover, Islamic banks are unlikely to be impacted simply because they do not deal with interest-based loans. Conventional banks on the other hand are affected by domestic interest rate because such a factor affects their interest-based products. The findings show that risk levels in conventional banks were higher with lower domestic interest rate.

The results show that capital assets ratio was found to have a negative relationship with Risk in both Islamic and conventional banks. However, since Diamond 1984 argues that an increase in equity can lower moral hazard problems and increase the monitoring incentives of banks (Diamond, 1984). Also higher equity can increase banks’ risk-taking capacity. The study found that the results are not consistent with previous literature.

Capital assets ratio affected both Islamic and conventional banks in the same manner. Although previous studies argue that risk is low with higher capital assets, the results were not as expected based on previous studies. The regional differences might have been the cause behind it.

There also appears to be a positive relationship between liquidity and risk as banks with higher liquidity levels have higher reserve levels. This suggests that banks with higher liquidity levels take on more risks which confirm to the Basel guidelines whereby banks are encourage being more liquid to cover the risks being taken. These results are consistent with Alam 2012.

The study found that liquidity was associated with risk. This was expected, as banks tend to have high liquidity along with higher risk they take. Banks need to have high liquidity to cover their risk. No difference was found among Islamic and conventional banks. No Sharī‘ah’ compliance regulations for liquidity by itself and therefore; the same outcome among Islamic and conventional banking is expected.

Return on equity was found affecting risk in a positive way in Islamic banks and a negative way in Conventional banks. However, interesting results were found when

considering insolvency risk with z score a measure. The results were opposite in conventional banks as return on equity were affecting risk in a positive manner. This can be explained, as insolvency risk is different from credit risk. This gives us the answer for the second research question.

The study found contradicting results among Islamic and conventional banks in terms of return on equity. The Sharī‘ah’ compliance regulations are expected to be the cause behind such contradiction.

5.3. Efficiency

The variable *NPL* captures the level of credit risk and the expected relationship with *EFF* is negative since more efficient banks have a better quality portfolio (Kwan and Eisenbeis, 1995; Resti, 1997; Bar *et al*., 2002). However, the empirical literature finds mixed evidence, Altunbas *et al*. (2000) suggests that efficiency is not very sensitive to credit risk whilst Hughes and Mester (1993) and Delis and Papanikolaou (2009) find an inverse relationship between credit risk and bank efficiency. The study found NPL to have a positive relationship with efficiency with a significance level in both Islamic and conventional. Although our results contradict with (Kwan and Eisenbeis, 1995; Resti, 1997; Bar *et al*., 2002), the results are consistent with others like Altunbas *et al*. (2000). In addition, the results also support the hypothesis of bad management proposed by Berger and DeYoung (1997), which suggests that poor management in the banking institutions results in bad quality loans, and therefore, escalates the level of non-performing loans

The (LOATA) Loan intensity variable reflects the lending intensity of the banking sector and a positive relationship with EFF is expected since loans are the main source of bank profits; however, the quality of the loans may deteriorate under some circumstances, for example during an economic recession, in which case a higher degree of loan intensity may be detrimental to bank efficiency which was the case in our results as loan intensity was found negative and significant in conventional banks. However, in Islamic banks the study found the normal scenario with a positive relationship to efficiency but not as significant.

Size had a positive relationship to efficiency in conventional banks. This is consistent with previous literature as Hauner (2005) explains that larger banks could pay less

for their inputs than their counterparts and that there could be increasing returns to scale through the allocation of fixed costs. Islamic banks on the other hand had a negative relationship but with no significant level to efficiency. Although this not consistent previous literature, it can be explained by the fact that Islamic banks still have a small portion of the banking sector even in Muslim countries. This small portion in the market can eliminate size differences among all Islamic banks. This is consistent with Isik & Hassan (2002) and Kaparakis *et al* (1994) who showed that average cost and profit efficiency decrease with increasing bank size. One plausible reason for this is that overhead costs for small bank are relatively low because they often operate few branches, so may possess operational advantage, which contributes to higher efficiency (Isik & Hassan, 2002).

The Z score, which represents insolvency risk, was found to have a significant and positive impact on efficiency in both Islamic and conventional banks. If we also consider NPL in order to observe the impact of risk as a whole on efficiency, the study found that our results are consistent with Altuncar who found that Inefficient European banks appear to take on less risk.

In terms of environmental factors, GDP Per Capita growth was found to be a significant aspect in Islamic banks only with a positive relationship to efficiency in Islamic and conventional banks. This suggests that an increase in the economic activity increases the demand for financial services, improving bank efficiency (Daley and Mathews, 2009; Delis and Papanikolaou, 2009). The results are similar to those found by (Garza-Garcia, 2010).

Market concentration (HHI) was found to be significant in both Islamic and conventional banks with a positive relationship. Some authors believe there is a negative relationship between CONC and EFF since in highly concentrated markets risk aversion may prevail (Sathye, 2001). In addition, Naceur et al. (2009) suggest that greater market concentration might reduce competition and thus efficiency. However, if economies of scale drive bank M&As, then increased concentration may lead to efficiency improvements (Demirguc-Kunt and Levine, 2000; Casu and Girardone, 2009). Because of the mix results reported by different scholars, the study found that the results are normal. The results are also consistent with (Garza-Garcia, 2010).

Muslim share was found to be affecting efficiency in both Islamic and conventional banks. However, the results vary. As Muslim share had a negative relationship with efficiency in Islamic banks and a positive relationship with efficiency in conventional banks.

Domestic interest rate was found to be significantly affecting efficiency in different manners. In Islamic banks, domestic interest rate had a positive relationship with efficiency. On the other hand, it had a negative relationship with efficiency in conventional banks. The results in conventional banks are consistent with Indonesia. This gives us the answer for the second part of our second research question

5.4. Financial Crisis

5.4.1. Islamic

Table 58. Descriptive Results. Islamic Only

Variable	Average Before	Average After
LLR	3.568862275	3.71
NPL	4.69112013	4.91
Z Score	1.828953771	1.68
EFF_Sco	.43	.69

In Islamic banks, credit risk was elevated but with a very low portion as shown in the table above loan loss reserves and non-performing loans had a slight rise. Insolvency risk on the other hand had a similar result as a little increase in Z score was observed.

Efficiency had a different result. As banking efficiency in Islamic banks was found to be better after the financial crisis with an increase of about 26%.

5.4.2. Conventional

Table 59. Descriptive Results. Islamic Only

Variable	Average Before	Average After
LLR	4.29	4.49
NPL	4.55	4.77
Z Score	2.61	2.21
EFF_Sco	.4956	.6434

In conventional banks, similar results were observed as credit risk was elevated but with a very low portion as shown in the table above loan loss reserves and non-performing loans had a slight rise. Insolvency risk on the other hand had a similar result as a little increase in Z score was found.

Efficiency in conventional banks and similarly to Islamic banks were different compared to risk. As banking efficiency in conventional banks was found to be better after the financial crisis with an increase of about 15% which is about 6% less than efficiency improvement in Islamic banks.

The study found that risk was negatively affected by the global financial crisis. The study also found that Islamic and conventional banks had no difference. In terms of banking efficiency, both Islamic and conventional banks showed a positive sign. As efficiency levels were elevated after the financial crisis. The only difference the study also found between Islamic and conventional banks is the level of increase, as Islamic banks had a higher level of increase by 6%. These findings provide an answer to the third research question.

5.5. Summary

This thesis examines the level of risk and efficiency, the determinants of risk and efficiency, and also examines the level of impact of the global financial crisis on risk and efficiency.

The findings show that credit risk levels were similar in both Islamic and conventional banks. Banks experience the same level of credit risk and the Sharī‘ah’ compliance regulations had no effect on the level of credit risk in Islamic banks.

This study has examined the potential financial aspects that affect risk and efficiency in all banks in ten countries in the MENA area and attempted to ascertain whether the level of impact is different from Islamic to conventional banking systems. Also, this study examined whether risk and efficiency in both Islamic and Conventional banks were affected by the global financial crisis and try to observe the level of impact. This study examined risk and efficiency over ten years to investigate present level and initiate trends in banking risk and efficiency.

In banking risk and after comparing the means of Islamic and conventional banks, with a little higher score for Islamic banks in terms of loan loss reserve and a little higher score in conventional banks in terms of non-performing loans, the study found that no serious difference between Islamic and conventional banks was found. As Credit risk in Islamic banks had a mean of 3.65 in loan loss reserve and a mean of 4.84 in non-performing loans. While in conventional banks as shown in table 2, loan loss reserves scored a mean of 4.40 and 4.68 for non-performing loans. Furthermore, Islamic and conventional banks experience the same level of credit risk.

Insolvency risk on the other hand was found to be different. As the study found a better mean score in conventional banks with a mean of 1.73 in Islamic and 2.38 in Conventional banks. Furthermore, conventional banks in MENA countries for the period of 2006 to 2015 were more stable than Islamic banks in the same area and during the same period.

In terms of the impact of financial aspects on credit risk. It was found that variables like Capital Assets Ratio, Size of the firm, Liquid Assets, GDP Per Capita, GDP Per Capita Growth, Muslim Share and HHI had the biggest impact on credit risk in Islamic banks while other variables like Return on Equity, Net Income, Domestic Interest Rate, Muslim Share, Loan Growth, Assets Growth, HHI and GDP Per Capita Growth were found to have the smallest impact on credit risk in Islamic banks.

In conventional banks, variables like Return on Equity, Size of the firm, Domestic Interest Rate, GDP Per Capita, GDP Per Capita Growth, Muslim Share and Assets Growth were found to be the most impacting credit risk in conventional banks. Other variables like Capital Assets Ratio, Net Income, Liquid Assets, Loan Growth and HHI had the least effect on credit risk in conventional banks.

In terms of the impact of financial aspects on insolvency risk. It was found that variables like Return on Equity, Muslim Share and HHI had the biggest impact on insolvency risk in Islamic banks while other variables like Capital Assets Ratio, Net Income, Size, Liquid Assets, Domestic Interest Rate, GDP Per Capita, GDP Per Capita Growth, Loan Growth and Assets Growth were found to have the smallest impact on insolvency risk in Islamic banks.

In conventional banks, variables like Capital Assets Ratio, Return on Equity, Net Income, Size, GDP Per Capita, GDP Per Capita Growth and Muslim Share were found to be the most impacting insolvency risk in conventional banks. Other variables like Liquid Assets, Domestic Interest Rate, Loan Growth, Assets Growth and HHI had the least effect on insolvency risk in conventional banks.

In banking Efficiency, when compared the efficiency scores in Islamic and conventional banks, the study found that the mean for Islamic banks was higher than the mean in conventional banks. The study found that Islamic banks in the MENA area for the period of 2006 to 2015 were more efficient than conventional banks.

In terms of the impact of financial aspects on efficiency. It was found that variables like Domestic Interest Rate, GDP Per Capita Growth, Muslim Share, HHI, Non-Performing Loans and Z Score had the biggest impact on risk in Islamic banks while other variables like Return on Equity, Size of the firm, Liquid Assets, GDP Per Capita, Loan Intensity and NIE were found to have the smallest impact on risk in Islamic banks.

In conventional banks, variables like Size of the firm, Domestic Rate, Muslim Share, HHI, Loan Intensity, Non-performing Loan and Z score were found to be the most impacting risk in conventional banks. Other variables like Return on Assets, Liquid Assets, GDP Per Capita, GDP Per Capita Growth and NIE had the least effect on risk in conventional banks.

After the global financial crisis, banking risk was negatively affected in both Islamic and conventional banks. Although the level of impact was little, we can observe the crisis impact and can also see that no difference was found between Islamic and conventional banks in terms of crisis impact.

Efficiency after the financial crisis was increased in both Islamic and conventional banks. The study found that the level of banking efficiency was better in both banking types with an increase of % 26 in Islamic banks and % 16 in conventional banks.

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6. Conclusion

6.1. Introduction

The principal aim of this chapter is to highlight the main conclusion of this investigation. This chapter is divided into five sections: an overview of the study; a summary of the key findings; a description of the contributions of the research in Risk and Efficiency; the limitations of the study; and finally, recommendations for further research in the field of risk and efficiency.

6.2. Overview

The study was divided into three main parts. First, provided measures of credit risk, insolvency risk and efficiency levels in both Islamic and conventional banks. Second, the study has investigated the potential factors affecting credit risk, insolvency risk and efficiency. Third, the study has examined the level of impact of the global financial crisis on credit risk, insolvency risk and efficiency in Islamic and conventional banks.

6.3. Key findings

After using two proxies to measure credit risk, the study has found that credit risk in Islamic and conventional banks is similar. A slight rise in loan loss reserve for conventional and a slight rise in non-performing loans in Islamic. The overall results show a similar credit risk levels in both Islamic and conventional banks in MENA.

Insolvency risk was different, as Islamic banks reported higher risk levels compared to conventional banks. Z scores were higher in conventional banks indicating that insolvency risk in Islamic banks was higher.

The study has found that efficiency levels in Islamic banks were also similar to efficiency levels in conventional banks. The Sharī‘ah’ compliance regulations did not affect the level of efficiency in Islamic banks performing in MENA.

The study was able to explore different macro and micro-economic factors with potential effect on credit risk in both Islamic and conventional banks. The study

found size, liquid assets, GDP per capita, domestic interest rate, capital assets ratio and liquidity to be impacting banking risk.

The study was also able to provide a list of different macro and micro-economic factors with an effect on efficiency. The list included non-performing loans, loan intensity, size, Z score, GDP per capita, market concentration, Muslim shares and domestic interest rate.

The study has investigated the impact of the global financial crisis on credit risk, insolvency risk and efficiency. The study found Islamic and conventional banks in MENA experienced an increase in credit risk. Both Islamic and conventional banks were less stable after the global financial with lower Z scores reported after the crisis.

The study has also investigated the global financial crisis effects on efficiency. Banks in MENA were more efficient after the crisis. Efficiency scores were higher after the crisis compared to those reported before or during the crisis.

Finally, the study has provided solid evidence to the researcher that Islamic finance is not properly implemented in MENA. The similar results among Islamic and conventional banks in MENA provide clear evidence that Sharī‘ah’ compliance regulations implemented by Islamic banks failed to provide the expected theoretical impact of Islamic finance on Islamic banks in MENA.

6.4. Contributions

This study bridges a gap between the three broad strands related to existing body of literature on risk and efficiency (measures the levels of risk and efficiency; explores the determinants of risk and efficiency, and investigates the economic consequences of the recent global financial crisis on risk and efficiency).

6.4.1. Theoretical & Empirical

The study contributes to the work of (Alam, 2012) in an expansion manner as (Alam, 2012) investigated efficiency determinants in the two banking systems (Islamic and Conventional). This study has used a larger sample, larger time-frame, different efficiency proxy and included some different efficiency determinants.

(Alam, 2012) investigated efficiency and risk in Islamic banks only. Also, (Alam, 2012) used the same potential independent variables on efficiency and risk. While in this study, different potential determinants in each investigation based on previous literature and real empirical needs.

The last contribution to the work of (Alam, 2012) is that in this study, three different risk proxies were applied in order to provide two different risk types (credit and insolvency) and in order to offer more accurate results for efficiency and risk empirical research.

The study also contributes to the work of (Abedifar, Molyneux and Tarazi, 2013). (Abedifar, Molyneux and Tarazi, 2013) investigated risk and its dererments in Islamic and conventional banks. However, the geographic difference in this study is crucial. With investigations in Islamic finance, countries with large Muslim populations are the main goals to test. Therefore, the geographic sample in this study adds to the empirical research in the field of Islamic finance as it covers the majority of countries with large Muslim shares in order to present reliable empirical results to the Islamic finance research.

After the recent global financial crisis, many empirical researchers have reported that Islamic and conventional banking systems were not affected in the same manner and the level of impact was different between them. In this particular way, this study fills the gap in the work of (Abedifar, Molyneux and Tarazi, 2013) who did not investigate or report the impact of the global financial crisis on risk. The study has filled that gap by providing different risk levels before and after the crisis in order to contribute to empirical research associated with the global financial crisis and its impact on all banking systems in general and Islamic banking in specific.

The study contributes to the work of (Abd Karim, Chan and Hassan, 2010) (Al-Tamimi, 2002; Al-Tamimi and Al-Mazrooei, 2007; Hassan, 2009) who investigated risk management practises in Islamic banking. Each work of these researchers has covered only one country, this fact opens a gap that results from the fact that each country could have its own macro and micro economic regulations and barriers and therefore, the overall results are not reliable to consider when Islamic banking is investigated. This gap is filled with this study’s sample which included ten different countries located in the heart of Islamic region.

Another contribution to the work of (Abd Karim, Chan and Hassan, 2010) (Al-Tamimi, 2002; Al-Tamimi and Al-Mazrooei, 2007; Hassan, 2009) is added when we consider the method of research in this study. This study has used a quantitative method to investigate risk while the mentioned studies have used a qualitative method. Dealing with banking risk which is mainly calculated in numbers, would be better investigated through methodologies that use numbers to investigate. In such a way, the final outcomes will be better analysed and presented, the quantitative method used in this study has covered that gap.

The study contributes to the work of (Garza-Garcia, 2010) and the work of (Sarmieuta and Galan, 2015) who investigated efficiency and its determinants in different countries. With only conventional banks covered in their work, the gap of providing results for Islamic banks is found as the tow banking systems are different and use different inputs in their regulations as discussed in previous chapters. This gap has been filled in this study by investigating Islamic banks along with conventional banks.

Another contribution to the work of (Garza-Garcia, 2010) and (Sarmieuta and Galan, 2015) is added by the fact that geographic, time-frame and regional differences have been considered. With most of the study's sample are from countries with oil-production countries like the GCC, high liquidity of course affects the financial market in general and banking sector in specific. All this in mind, adds a contribution to the empirical research in the field of efficiency.

In short, and to conclude this part. the study differs from all of the mentioned studies by the fact that it investigated both risk and efficiency at the same time. As (Garza-Garcia, 2010), Sarmieuta and E. Galan, 2015) and (Alam, 2012) examined efficiency only. While, Abedifar, Molyneux and Tarazi, 2013) (Abd Karim, Chan and Hassan, 2010) (Al-Tamimi, 2002; Al-Tamimi and Al-Mazrooei, 2007; Hassan, 2009) investigated risk only.

6.4.2. Practical

Banks can benefit from the fact that size can influence their level of risk as larger banks are reported with higher risk levels. Banks, especially large ones can take that into account in their risk management process in order to lower risk or to prevent potential size impact on risk.

Banks should also consider the share of Muslims in which country they operate, as the level of Muslim shares is reported to have an effect on the level of risk. Further investigation and interpretation is required by banks in order to understand “Muslim share” within the market especially for Islamic banks or banks with Islamic windows.

As liquid assets are reported to have an impact on risk, banks should consider working on matching their needs to balance higher capital requirements. Banks should consider the effect of liquid assets in their risk management process in order to first; minimise the potential rise in risk caused by liquid assets, and second; to meet their needs in their capital requirements.

Macro-economic factors are also reported to affect the banking level of risk, this normal and expected as banking inputs and outputs are impacted by these factors. However, banks should consider how changes in these factors can affect their level of risk. GDP Per Capita and domestic rates are the two main macro-economic that were reported to have a direct impact on risk. Domestic interest rates in particular, should be very understood by banks especially conventional banks such a factor influence their interest-rate loans while Islamic banks should not be directly affected by domestic interest rates because of Sharī‘ah’ regulations that do not approve direct interest.

Banks in MENA countries should also consider their capital assets ratio when they work on their risk management. Although previous empirical studies have reported that risk should be low when capital assets ratio is high, Banks in MENA countries have reported that risk is high when capital assets ratio is high. Furthermore, banks in MENA should consider the regional differences.

Banks in MENA need to consider the level of risk that was associated with liquidity, especially banks in GCC for the fact that Liquidity is very high in such oil-production countries. As banks tend to have high liquidity along with higher risk they take. Banks need to balance their liquidity levels and their liquidity needs to cover their risk. Islamic banks need to take no different actions than conventional banks because no Sharī‘ah’ compliance regulations for liquidity by itself and therefore; the same outcome among Islamic and conventional banking is expected.

Banks’ risk was reported to be affected by return on equity in different ways among Islamic and conventional banks. Islamic banks need further investigation to work on

their equity on risk because Sharī‘ah’ compliance regulations are expected to be the cause behind such contradiction with conventional banks.

The study reported that risk, presented as “non-performing loans” affected efficiency. The efficiency level was high when risk levels are high. Banks in the MENA area are advised to balance between their desired efficiency levels and their level of risk.

Banks’ efficiency level was reported to be impacted by loans, banks in MENA especially conventional banks need to consider loan intensity elevating levels because high loan intensity was found with low efficiency. In Islamic banks, the prohibition of direct interest “riba” and the Sharī‘ah’ regulations might have played a part in the relationship as high efficiency levels was reported with high efficiency scores, therefore, Islamic banks are advised to take advantage of that relationship.

Size of the bank also impacted efficiency levels especially for conventional banks. Larger banks need to take advantage of that relationship as efficiency levels are high with large banks. Islamic banks on the other hand do not benefit from that relationship and this can be a result of their low market portion compared with conventional banks.

Insolvency risk, presented by Z score has also affected efficiency in both Islamic and conventional banks in MENA. As banks are reported to be riskier with high efficiency levels, banks need to balance between their desired efficiency levels and the acceptable level of insolvency risk they are willing to take. As Islamic and conventional banks experience the same impact, Islamic banks do not to take any different action from conventional banks in MENA.

Efficiency was no different than risk in its relationship with macro-economic factors especially in Islamic banks. As Islamic banks reported high efficiency levels with high GDP Per Capita, Islamic banks are advised to consider the level of impact made by GDP Per Capita on their efficiency.

Banks in MENA reported high efficiency levels with high market concentration. As a result of this report, banks in MENA need to put more market investigations in order to take advantage of market concentration increase to improve their efficiency levels.

Banks efficiency was also affected by the share of Muslims in each county. Banks reported high efficiency levels with higher Muslim shares and Islamic banks reported

low efficiency levels with higher Muslim shares. As banks in MENA are operating in countries with high Muslim shares in most countries, it is extremely important for banks especially Islamic banks in MENA to consider Muslim shares in the county where they operate and try to observe how to deal with Muslim shares level of impact to improve their efficiency scores.

Domestic interest rate was another macro-economic factor to affect banking efficiency. Islamic banks reported that efficiency scores were high with high domestic interest rate, while conventional banks reported low efficiency levels with high domestic interest rate. As previously discussed that domestic interest rate deal directly with banking interest rate, and as Islamic Sharī'ah' regulations do not approve direct interest. It is clear how the level of impact is different between Islamic and conventional banks. Banks in MENA, especially conventional banks need to carefully consider changes in domestic interest when they try to improve their efficiency levels. Although direct interest is prohibited in Islamic banks, domestic interest rate still had an impact on efficiency, therefore; Islamic banks also need to investigate the impact of domestic interest rate on their efficiency scores.

6.5. Implications

4.10.1. Theory

This work provides a further extension of the work carried out by Alam (2012), which sought to examine the determinants of efficiency across the two banking systems, i.e. conventional and Islamic. This work further took a larger sample, greater period of time, various efficiency proxies, and actively ensured the inclusion of various efficiency-related determinants.

Efficiency and risk was examined in the work of Alam (2012) specifically in consideration to Islamic banks, with the same possible independent variables on efficiency and risk. In contrast to this research effort, the present studies takes a number of possible determinants in each investigation in line with prior literature and actual empirical requirements. Furthermore, as a further contribution to this line of study, this present work will apply different risk proxies in an effort to consider different types of risk, namely credit and insolvency, in an effort to provide more credible and precise findings for efficiency and risk empirical studies.

As a further contribution to this body of literature, this study extends the work carried out by Abedifar, Molyneux & Tarazi (2013), which sought to examine risk and its determinants across

both conventional and Islamic banking systems. Nonetheless, in this work, the geographic differences are fundamental. In consideration to investigations in Islamic finance, those regions known to have significant numbers of Muslims are the key target for testing. Accordingly, in this study, the geographic sample adds values to the empirical research in the Islamic finance domain through encompassing most countries with large Muslim shares. This is done in order to provide the literature with reliable empirical findings that can go some way to enhancing research in the field of Islamic finance.

Following the financial crisis that recently swept the globe, a number of different empirical researchers have directed their efforts towards examining conventional and Islamic banking systems, and accordingly found that there were differences from one system to the next in terms of how they were affected. In this way, the present work seeks to fill the gap identified in the study carried out by Abedifar, Molyneux & Tarazi (2013), which failed to examine or direct attention towards the effects of the global financial crisis in line with risk. Importantly, this gap is filled in this work by considering different levels of risk both prior to and following the crisis; this is done in mind of providing a conscious contribution to the empirical research associated with the global financial crisis and its overall effects across all banking systems, as well as Islamic banking in particular.

Moreover, this work provides a contribution in line with that conducted by other scholars in the field (Abd Karim, Chan & Hassan, 2010; Al-Tamimi, 2002; Al-Tamimi & Al-Mazrooei, 2007; Hassan, 2009), which sought to examine Islamic banking's risk management approaches. These works focused on one country only, which creates an identifiable gap owing to the recognition that all regions have their own economic regulations and obstacles, meaning that the results garnered, as a whole, cannot be taken at face value when investigating Islamic banking. This gap is filled by the present work through the inclusion of ten different countries in the study sample, all of which are located at the core of the Islamic region.

The present work further identifies a contribution to be made in regards the studies carried out by Abd Karim, Chan & Hassan (2010), Al-Tamimi (2002), Al-Tamimi & Al-Mazrooei (2007) and Hassan (2009) through consideration to the research strategy adopted in this work. The current research adopted a quantitative approach in mind of examining risk, whereas the aforementioned studies applied qualitative approaches. When considering banking risk, which is predominantly centred on numbers and figures, it is considered that a quantitative approach

would be more valuable. In this regard, the final results could facilitate improved analysis and presentation. Thus, the approach applied in this work has been successful in filling this gap.

This work also adds to those by Garza-Garcia (2010) as well as that of Sarmieuta & Galan (2015), which examined the determinants of efficiency and efficiency overall in different countries but with limited focus on conventional banking systems only; this therefore created a gap in terms of examining Islamic banking systems. This study provides a contribution in this regard through examining Islamic banking systems in line with more conventional frameworks.

When considering the works of Garza-Garcia (2010) and Sarmieuta & Galan (2015), further contribution is made by this work when considering the regional, timescale-related and geographic differences. Owing to the fact that the majority of the sample came from oil-production regions, as in the case of the GCC, it can be seen that high liquidity would have an influence on the financial market overall, as well as specifically in and across the banking sector. With this taken into consideration, a contribution is made to the empirical research in regards efficiency.

To sum up, this work provides key differences when compared to other works detailed in the literature, predominantly in the fact that both efficiency and risk are taken into account in this work, whilst others (Garza-Garcia, 2010; Sarmieuta & Galan, 2015; Alam, 2012) have focused only on efficiency, with other scholars (Abedifar, Molyneux & Tarazi, 2013; Abd Karim, Chan & Hassan, 2010; Al-Tamimi, 2002; Al-Tamimi & Al-Mazrooei, 2007; Hassan, 2009) concerned only with risk.

4.10.2. In Practice

Size can affect risk levels amongst banks, which can prove to be beneficial to banks, where larger banks have higher risk levels but are positioned to consider this when applying a risk management strategy with the objective to decrease their levels of risk or otherwise entirely circumvent possible size impacts on risk. Furthermore, there is also the need to take into account the number of Muslims in any country in which banks are operating: the degree of Muslim share is recognised as influencing risk levels. Nonetheless, a greater scope of investigation and interpretation is necessary if Muslim share across the market—particularly that of Islamic banking—is to be fully understood.

Owing to the fact that risk is known to be affected by liquid assets, there is a need for banking institutions to take into account how their needs can be aligned so as to ensure greater capital requirements are balanced. Furthermore, the effects of liquid assets on risk management first need to be considered if the possible rise in risk is to be minimised, as well as if capital requirement needs are to be fulfilled.

In addition, levels of risk across banking institutions are seen to be influenced by macro-economic factors; this is both commonplace and expected, with such factors affecting banking inputs and outputs. Nonetheless, there is a need for banks to consider how such factors and the way in which they change can influence risk levels. As an example, GDP Per Capita and domestic rates are identified as the two key macro-economic factors known to impact risk. Domestic interest rates, more specifically, require understanding and insight by banks—particularly those operating on a conventional basis—as these aspects are able to affect interest-rate loans whereas Islamic banks may not be influenced by domestic interest rates owing to the fact that direct interest is prohibited by Sharia.

In MENA regions, banks are also required to take into account their capital assets ratio when working on risk management. Despite the fact that other empirical works have highlighted risk as low when there is a high capital assets ratio, nonetheless, banks operating in MENA regions highlight risk as being high in line with high capital assets ratio. In addition, banks in MENA also need to take into account any regional differences.

The risk facing banks was recognised as being affected by return on equity in varying ways amongst both conventional and Islamic banks, with the former requiring more in-depth examination in line with their equity on risk owing to the fact that Sharia-compliance regulations are believed to underpin the causes behind such contradictions with conventional banking systems.

It was found that risk, when viewed through the lens of ‘non-performing loans’, was seen to influence efficiency, with such levels found to be high in line with high risk levels. In the MENA region, banks are given the advice to ensure a balance is struck between the necessary efficiency levels and their risk levels. More specifically, in the MENA region, loans were found to have a notable impact on the overall efficiency of banks, particularly across conventional banks, with these institutions needing to take into account loan intensity, with greater loan intensity recognised as being aligned with low efficiency. In the case of Islamic banks, direct interest being prohibited could also play a role: greater efficiency levels were seen to be

recognised with high efficiency scores, meaning Islamic banks should exploit this to the greatest possible extent.

As can be seen when considering the influence of the Z score, which relates to insolvency risk, both conventional and Islamic banks operating in the MENA region are recognised as affected in terms of efficiency. Owing to the fact that banks are seen to be riskier when there are greater levels of efficiency, there is a need for acceptable levels of insolvency risk to be balanced out with efficiency. Owing to the fact that conventional and Islamic banks both come to face the same effect, no differing actions are taken by conventional and Islamic banks in MENA.

When contrasting risk and efficiency in line with their relationship with macro-economic factors, particularly across Islamic banks, no difference could be seen. Islamic banks were found to demonstrate high levels of efficiency with high GDP Per Capita, meaning there is a need for them to take into account the level of impact by GDP Per Capita in line with banking efficiency.

Furthermore, in the MENA region, banks were found to report greater efficiency levels with a greater degree of market concentration. Following on from this finding, MENA-based banks need to complete more thorough and wide-ranging investigations if they are to exploit and best utilise market concentration in mind of improving efficiency levels.

Importantly, the efficiency of banks was influenced by Muslim share across each country. High efficiency levels were found amongst those banks with higher Muslim shares, whilst lower efficiency levels were found by Islamic banks with higher Muslim shares. Owing to the fact that MENA region-based banks face high Muslim shares in the majority of countries, there is a pressing need for banks, particularly those in the MENA region, to take into account the factor of Muslim share and to accordingly observe the way in which Muslim share levels can influence and be directed towards enhancing their overall efficiency.

One further macro-economic factor seen to influence efficiency across banks is the domestic interest rate. Islamic banks demonstrated high efficiency scores in line with high domestic interest rates; conventional banking systems, on the other hand, demonstrated low efficiency with high interest rates. As has been considered in the past, domestic interest rates deal with banking interest rates; as Sharia prohibits direct interest, this then emphasises how the level of effect differs between banking systems. Those banks operating in the MENA region, particularly those adopting the conventional system, should direct careful consideration towards the ways in which their efficiency levels may be influenced by domestic interest.

Despite the fact that direct interest is not permitted across Islamic banking institutions, it remains that domestic interest continues to influence efficiency; therefore, there is a need for Islamic banks to examine the effects of such interest rates on efficiency scores overall.

6.6. Limitations of the study

This research widens our knowledge on “risk levels and its determinants” from one side, and “efficiency levels and its determinants” from the other side. Further, it increases the knowledge on the determinants and economic consequences of risk and efficiency. However, there is no research without any limitations, and this investigation is no exception.

First, the study investigated only two types of risk, while other risk types like liquidity risk, interest rate risk, market risk and operational risk are as important. Second, efficiency is divided into different types. Cost efficiency and profit efficiency. We only used a single efficiency score which of course provide a level of efficiency but not as comprehensive as other efficiency types. Third, the global financial crisis would be better divided into three periods. “Before, during and after” the crisis. However, due to this thesis’ sample, it was not able to investigate the impact before, during and after the crisis.

6.7. Recommendations for future research

In Islamic finance, a country like Malaysia is considered a pioneer in that field. However, Malaysia was not included in our sample. Of course, it would have added significant results. Other important risk types like liquidity risk, market risk, and interest rate risk are as important as credit and insolvency risk, therefore; further research on these risk types would provide more comprehensive risk investigation which will contribute to the field of risk and risk management. Different efficiency calculations’ approaches deliver more accurate efficiency scores; further research with consideration of those approaches will provide contributions to the field of banking efficiency.

Countries like Egypt and Tunisia experienced political instability since 2011. Therefore, to control for these two countries would result interesting analysis that can be added to this sample.

Other macro and micro economic aspects could be included to investigate further. Aspects like interest rate, inflation rate, credit ratings, legal can provided more accurate findings.

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8. Appendix

Table 1, Descriptive Analysis (All Banks)

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	1835	-4	9	4.23	2.007
NP.L	1436	0	33	0.18	1.415
Z Score	1918	-4	17	2.21	2.260
EFF Scores	1853	0.80	1.96	0.910	0.079
CAR	2198	-1	1	0.21	0.206
Return on Equity ROE	2189	-9	10	0.09	0.376
Net Income	2185	-1303	2889	178.2	387.6
Size	2200	2	12	7.83	1.854
LAD	2112	0	2808	5.99	107.1
Domestic Interest Rate %	2014	1	23	7.51	6.684
GDP PerCapita	2550	868.3	96732.4	17522.7	19853.6
GDP PerCapita Growth %	2550	-15.1	9.352	1.320	4.203
Muslim Share	2550	0	1	0.76	0.429
HHI	2200	0	1	0.01	0.026
LGrowth	2056	-92931	27389	183.2	4564.5
Agrowth	2135	-133614	43005	291.6	6540.9
Valid N (listwise)	1025				

Table 2 Regression Results for Risk. Islamic Only, Loan Loss Reserves as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.706	46.877	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				-6.478	-8.227	.000				
CAR				-2.943	-3.684	.000	1	Negative	.363	2.753
Return on Equity ROE				.029	.078	.938		Positive	.826	1.210
Net Income				.000	-1.000	.318		Negative	.467	2.143
Size				1.327	14.106	.000	1	Positive	.363	2.752
LAD				.441	2.980	.003	5	Positive	.433	2.308

Domestic Interest Rate %		.010	.672	.502		Positive	.638	1.568
GDP PerCapita		-1.679E-05	-5.336	.000	1	Negative	.613	1.631
GDP PerCapita Growth %		-.025	-1.763	.079	10	Negative	.802	1.246
Muslim Share		.232	1.470	.143		Positive	.690	1.449
LGrowth		-8.075E-06	-.196	.845		Negative	.305	3.279
Agrowth		-1.698E-05	-.563	.574		Negative	.288	3.477
HHI		7.644	1.139	.256		Positive	.613	1.631

Table 3 Regression Results for Risk. Conventional Only, Loan Loss Reserves as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.734	267.690	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				-3.247	-12.913	.000				
CAR				-.331	-1.313	.189		Negative	.708	1.413
Return on Equity ROE				-.259	-3.427	.001	5	Negative	.947	1.056
Net Income				4.716E-05	.487	.626		Positive	.421	2.375
Size				.957	33.966	.000	1	Positive	.351	2.850
LAD				-1.810E-05	-.078	.938		Negative	.994	1.006
Domestic Interest Rate %				-.042	-8.322	.000	1	Negative	.665	1.504
GDP PerCapita				-1.224E-05	-7.444	.000	1	Negative	.694	1.441
GDP PerCapita Growth %				-.022	-3.021	.003	5	Negative	.769	1.300
Muslim Share				.524	6.032	.000	1	Positive	.670	1.492

LGrowth		1.254E-05	1.128	.260		Positive	.309	3.233
Agrowth		-1.791E-05	-2.239	.025	10	Negative	.303	3.306
HHI		-1.574	-1.267	.206		Negative	.733	1.364

Table 4 Regression Results for Risk. Islamic Only, Non-Performing Loans as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.555	21.719	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				-2.734	-2.474	.014				
CAR				-4.641	-3.513	.001	5	Negative	.372	2.692
Return on Equity ROE				-.153	-.339	.735		Negative	.837	1.195
Net Income				.000	-.586	.558		Negative	.441	2.266
Size				.977	7.608	.000	1	Positive	.340	2.944

LAD		.366	1.698	.091	10	Positive	.428	2.338
Domestic Interest Rate %		.011	.610	.543		Positive	.597	1.674
GDP PerCapita		-1.322E-05	-3.471	.001	5	Negative	.581	1.722
GDP PerCapita Growth %		.009	.520	.604		Positive	.852	1.174
Muslim Share		-.321	-1.687	.093	10	Negative	.698	1.433
LGrowth		-8.284E-06	-.177	.859		Negative	.324	3.084
Agrowth		-6.986E-06	-.204	.839		Negative	.305	3.282
HHI		26.182	3.349	.001	5	Positive	.580	1.725

Table 5 Regression Results for Risk. Conventional Only, Non-Performing Loans as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.637	147.503	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				-2.285	-7.373	.000				
CAR				-.255	-.821	.412		Negative	.721	1.387
Return on Equity ROE				-.261	-2.824	.005	5	Negative	.936	1.069
Net Income				5.501E-05	.482	.630		Positive	.405	2.470
Size				.858	24.833	.000	1	Positive	.344	2.905
LAD				3.401E-05	.129	.897		Positive	.994	1.006
Domestic Interest Rate %				-.042	-6.937	.000	1	Negative	.629	1.590
GDP PerCapita				-1.301E-05	-6.752	.000	1	Negative	.703	1.422
GDP PerCapita Growth %				-.024	-2.828	.005	5	Negative	.776	1.288
Muslim Share				.445	4.344	.000	1	Positive	.677	1.476

LGrowth		9.294E-06	.731	.465		Positive	.306	3.268
Agrowth		-1.818E-05	-1.979	.048	10	Negative	.299	3.344
HHI		-1.802	-1.258	.209		Negative	.738	1.354

Table 6 Regression Results for Risk. Islamic Only, Z Score as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.290	8.831	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				-.949	-.760	.448				
CAR				-1.599	-1.341	.181		Negative	.293	3.410
Return on Equity ROE				4.318	4.931	.000	1	Positive	.715	1.400

Net Income		.001	1.286	.200		Negative	.432	2.313
Size		.201	1.336	.183		Positive	.339	2.954
LAD		.309	1.413	.159		Positive	.368	2.719
Domestic Interest Rate %		.027	1.021	.308		Positive	.609	1.643
GDP PerCapita		5.433E-06	1.001	.318		Positive	.637	1.570
GDP PerCapita Growth %		.004	.156	.876		Positive	.822	1.217
Muslim Share		.761	2.898	.004	5	Positive	.623	1.606
LGrowth		-1.239E-06	-.018	.986		Negative	.300	3.335
Agrowth		-1.820E-05	-.356	.722		Negative	.283	3.539
HHI		-25.667	-2.297	.023	10	Negative	.620	1.612

Table 7 Regression Results for Risk. Conventional Only, Z Score as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.195	22.080	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				.467	.818	.413				
CAR				-1.027	-1.837	.066	10	Negative	.682	1.466
Return on Equity				.888	4.610	.000	1	Positive	.937	1.067
Net Income				.001	5.145	.000	1	Positive	.422	2.372
Size				.120	1.851	.064	10	Positive	.340	2.941
LAD				-.001	-1.197	.232		Negative	.995	1.005
Domestic Interest Rate %				.006	.537	.591		Positive	.617	1.621
GDP PerCapita				2.492E-05	6.222	.000	1	Positive	.690	1.449

GDP PerCapita Growth %		.034	2.007	.045	10	Positive	.771	1.298
Muslim Share		.540	2.703	.007	5	Positive	.640	1.562
LGrowth		-2.173E-05	-.817	.414		Negative	.296	3.376
Agrowth		8.367E-06	.434	.664		Positive	.290	3.449
HHI		2.471	.817	.414		Positive	.742	1.347

Table 8 Regression Results for Efficiency. Islamic Only, Efficiency as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.129	3.360	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				.979	16.663	.000				

ROA		.161	.557	.578		Positive	.733	1.363
Size		-.005	-.776	.439		Negative	.472	2.120
LAD		-.001	-.225	.822		Negative	.857	1.167
Domestic Interest Rate %		.002	2.002	.047	10	Positive	.537	1.861
GDP PerCapita		-3.426E-07	-1.489	.138		Negative	.656	1.523
GDP PerCapita Growth %		.002	2.068	.040	10	Positive	.860	1.163
Muslim Share		-.026	-2.198	.029	10	Negative	.648	1.544
HHI		1.523	3.067	.002	5	Positive	.542	1.846
LoanIntensity		.027	.959	.339		Positive	.783	1.277
CRNPL		.140	2.150	.033	10	Positive	.765	1.307
NIE		-.625	-1.560	.121		Negative	.643	1.554
Z Score		.006	2.115	.036	10	Positive	.690	1.449

Table 9 Regression Results for Efficiency. Conventional Only, Efficiency as dependent

	R Square	F	Sig.						Collinearity Statistics	
	.328	36.427	.000[c]	Beta	t	Sig.	*** Sig	Po/Ne	Tolerance	VIF
(Constant)				.781	61.358	0.000				
ROA				.100	1.391	.164		Positive	.919	1.089
Size				.018	13.165	.000	1	Positive	.699	1.431
LAD				-1.391E-05	-.957	.339		Negative	.993	1.007
Domestic Interest Rate %				-.001	-1.797	.073	10	Negative	.563	1.776
GDP PerCapita				4.719E-08	.412	.681		Positive	.691	1.448
GDP PerCapita Growth %				.001	1.135	.257		Positive	.777	1.287
Muslim Share				.015	2.508	.012	10	Positive	.659	1.518
HHI				.254	3.113	.002	5	Positive	.764	1.309
LoanIntensity				-.076	-7.434	.000	1	Negative	.808	1.238

CRNPL	.004	3.430	.001	5	Positive	.886	1.128
NIE	.008	.962	.336		Positive	.940	1.064
Z Score	.002	2.278	.023	10	Positive	.842	1.187

Table 10 Descriptive Results. Islamic Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	415	-3	8	3.65	2.150
LnNPL	261	-3	8	4.84	1.607
Z Score	499	-3	14	1.73	1.745

Effeciency Scores	650	0	8	.56	.741
Valid N (listwise)	219				

Table 11 Descriptive Results. Conventional Only

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LLR1	1420	-4	9	4.40	1.961
LnNPL	1168	-4	9	4.68	1.821

Z Score	1419	-4	17	2.38	2.393
Effeciency Scores	1900	.000000000 0000000	1.00000000 00000000	.569381071 736843	.383402483 964910
Valid N (listwise)	985				

Table 12 Coefficients results for Risk. Islamic Only, Loan Loss Reserves as dependent

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-6.478	.787		-8.227	.000		
	CAR	-2.943	.799	-.219	-3.684	.000	.363	2.753

Return on Equity ROE	.029	.367	.003	.078	.938	.826	1.210
Net Income	.000	.000	-.052	-1.000	.318	.467	2.143
Size	1.327	.094	.838	14.106	.000	.363	2.752
LAD	.441	.148	.162	2.980	.003	.433	2.308
Domestic Interest Rate %	.010	.015	.030	.672	.502	.638	1.568
GDP PerCapita	-1.679E-05	.000	-.244	-5.336	.000	.613	1.631
GDP PerCapita Growth %	-.025	.014	-.070	-1.763	.079	.802	1.246
Muslim Share	.232	.158	.063	1.470	.143	.690	1.449
LGrowth	-8.075E-06	.000	-.013	-.196	.845	.305	3.279
Agrowth	-1.698E-05	.000	-.038	-.563	.574	.288	3.477
HHI	7.644	6.711	.052	1.139	.256	.613	1.631

Table 13 Coefficients results for Risk. Conventional Only, Loan Loss Reserves as dependent

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

1	(Constant)	-3.247	.251		-12.913	.000		
	CAR	-.331	.252	-.024	-1.313	.189	.708	1.413
	Return on Equity ROE	-.259	.076	-.053	-3.427	.001	.947	1.056
	Net Income	4.716E-05	.000	.011	.487	.626	.421	2.375
	Size	.957	.028	.868	33.966	.000	.351	2.850
	LAD	-1.810E-05	.000	-.001	-.078	.938	.994	1.006
	Domestic Interest Rate %	-.042	.005	-.155	-8.322	.000	.665	1.504
	GDP PerCapita	-1.224E-05	.000	-.135	-7.444	.000	.694	1.441
	GDP PerCapita Growth %	-.022	.007	-.052	-3.021	.003	.769	1.300
	Muslim Share	.524	.087	.112	6.032	.000	.670	1.492
	LGrowth	1.254E-05	.000	.031	1.128	.260	.309	3.233
	Agrowth	-1.791E-05	.000	-.062	-2.239	.025	.303	3.306
	HHI	-1.574	1.243	-.022	-1.267	.206	.733	1.364

Table 14 Coefficients results for Risk. Islamic Only, Non-Performing Loans as dependent

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

1	(Constant)	-2.734	1.105		-2.474	.014		
	CAR	-4.641	1.321	-.272	-3.513	.001	.372	2.692
	Return on Equity ROE	-.153	.450	-.018	-.339	.735	.837	1.195
	Net Income	.000	.000	-.042	-.586	.558	.441	2.266
	Size	.977	.128	.617	7.608	.000	.340	2.944
	LAD	.366	.216	.123	1.698	.091	.428	2.338
	Domestic Interest Rate %	.011	.018	.037	.610	.543	.597	1.674
	GDP PerCapita	-1.322E-05	.000	-.215	-3.471	.001	.581	1.722
	GDP PerCapita Growth %	.009	.017	.027	.520	.604	.852	1.174
	Muslim Share	-.321	.191	-.095	-1.687	.093	.698	1.433
	LGrowth	-8.284E-06	.000	-.015	-.177	.859	.324	3.084
	Agrowth	-6.986E-06	.000	-.017	-.204	.839	.305	3.282
	HHI	26.182	7.819	.208	3.349	.001	.580	1.725

Table 15 Coefficients results for Risk. Conventional Only, Non-Performing Loans as dependent

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

1	(Constant)	-2.285	.310		-7.373	.000		
	CAR	-.255	.311	-.018	-.821	.412	.721	1.387
	Return on Equity ROE	-.261	.092	-.056	-2.824	.005	.936	1.069
	Net Income	5.501E-05	.000	.014	.482	.630	.405	2.470
	Size	.858	.035	.806	24.833	.000	.344	2.905
	LAD	3.401E-05	.000	.002	.129	.897	.994	1.006
	Domestic Interest Rate %	-.042	.006	-.167	-6.937	.000	.629	1.590
	GDP PerCapita	-1.301E-05	.000	-.153	-6.752	.000	.703	1.422
	GDP PerCapita Growth %	-.024	.009	-.061	-2.828	.005	.776	1.288
	Muslim Share	.445	.103	.100	4.344	.000	.677	1.476
	LGrowth	9.294E-06	.000	.025	.731	.465	.306	3.268
	Agrowth	-1.818E-05	.000	-.069	-1.979	.048	.299	3.344
	HHI	-1.802	1.432	-.028	-1.258	.209	.738	1.354

Table 16 Coefficients results for Risk. Islamic Only, Z Score as dependent

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

1	(Constant)	-.949	1.249		-.760	.448		
	CAR	-1.599	1.193	-.138	-1.341	.181	.293	3.410
	Return on Equity ROE	4.318	.876	.324	4.931	.000	.715	1.400
	Net Income	.001	.000	.109	1.286	.200	.432	2.313
	Size	.201	.151	.128	1.336	.183	.339	2.954
	LAD	.309	.219	.129	1.413	.159	.368	2.719
	Domestic Interest Rate %	.027	.026	.073	1.021	.308	.609	1.643
	GDP PerCapita	5.433E-06	.000	.070	1.001	.318	.637	1.570
	GDP PerCapita Growth %	.004	.024	.010	.156	.876	.822	1.217
	Muslim Share	.761	.262	.204	2.898	.004	.623	1.606
	LGrowth	-1.239E-06	.000	-.002	-.018	.986	.300	3.335
	Agrowth	-1.820E-05	.000	-.037	-.356	.722	.283	3.539
	HHI	-25.667	11.173	-.162	-2.297	.023	.620	1.612

Table 17 Coefficients results for Risk. Conventional Only, Z Score as dependent

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.467	.571		.818	.413		

CAR	-1.027	.559	-.062	-1.837	.066	.682	1.466
Return on Equity ROE	.888	.193	.132	4.610	.000	.937	1.067
Net Income	.001	.000	.220	5.145	.000	.422	2.372
Size	.120	.065	.088	1.851	.064	.340	2.941
LAD	-.001	.001	-.033	-1.197	.232	.995	1.005
Domestic Interest Rate %	.006	.012	.019	.537	.591	.617	1.621
GDP PerCapita	2.492E-05	.000	.208	6.222	.000	.690	1.449
GDP PerCapita Growth %	.034	.017	.064	2.007	.045	.771	1.298
Muslim Share	.540	.200	.094	2.703	.007	.640	1.562
LGrowth	-2.173E-05	.000	-.042	-.817	.414	.296	3.376
Agrowth	8.367E-06	.000	.022	.434	.664	.290	3.449
HHI	2.471	3.026	.026	.817	.414	.742	1.347

Table 18 Coefficients results for Efficiency. Islamic Only, Efficiency as dependent

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF

1	(Constant)	.979	.059		16.663	.000		
	ROA	.161	.289	.044	.557	.578	.733	1.363
	Size	-.005	.007	-.076	-.776	.439	.472	2.120
	LAD	-.001	.006	-.016	-.225	.822	.857	1.167
	Domestic Interest Rate %	.002	.001	.184	2.002	.047	.537	1.861
	GDP PerCapita	-3.426E-07	.000	-.124	-1.489	.138	.656	1.523
	GDP PerCapita Growth %	.002	.001	.151	2.068	.040	.860	1.163
	Muslim Share	-.026	.012	-.184	-2.198	.029	.648	1.544
	HHI	1.523	.497	.281	3.067	.002	.542	1.846
	LoanIntensity	.027	.028	.073	.959	.339	.783	1.277
	CRNPL	.140	.065	.166	2.150	.033	.765	1.307
	NIE	-.625	.401	-.131	-1.560	.121	.643	1.554
	Z Score	.006	.003	.172	2.115	.036	.690	1.449

Table 19 Coefficients results for Efficiency. Conventional Only, Efficiency as dependent

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	Collinearity Statistics

		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.781	.013		61.358	0.000		
	ROA	.100	.072	.040	1.391	.164	.919	1.089
	Size	.018	.001	.438	13.165	.000	.699	1.431
	LAD	-1.391E-05	.000	-.027	-.957	.339	.993	1.007
	Domestic Interest Rate %	-.001	.000	-.067	-1.797	.073	.563	1.776
	GDP PerCapita	4.719E-08	.000	.014	.412	.681	.691	1.448
	GDP PerCapita Growth %	.001	.000	.036	1.135	.257	.777	1.287
	Muslim Share	.015	.006	.086	2.508	.012	.659	1.518
	HHI	.254	.081	.099	3.113	.002	.764	1.309
	LoanIntensity	-.076	.010	-.230	-7.434	.000	.808	1.238
	CRNPL	.004	.001	.101	3.430	.001	.886	1.128
	NIE	.008	.008	.028	.962	.336	.940	1.064
	Z Score	.002	.001	.069	2.278	.023	.842	1.187

Efficiency Scores, All banks

Bank N	Year	Country C	Effeciency Scores
National Commercial Bank (The)	2015	SA	0
National Commercial Bank (The)	2014	SA	1
National Commercial Bank (The)	2013	SA	1
National Commercial Bank (The)	2012	SA	1
National Commercial Bank (The)	2011	SA	1
National Commercial Bank (The)	2010	SA	1
National Commercial Bank (The)	2009	SA	1
National Commercial Bank (The)	2008	SA	1
National Commercial Bank (The)	2007	SA	1
National Commercial Bank (The)	2006	SA	0.876556
Al Rajhi Banking & Investm	2015	SA	0
Al Rajhi Banking & Investm	2014	SA	1
Al Rajhi Banking & Investm	2013	SA	0.988411
Al Rajhi Banking & Investm	2012	SA	0.99087
Al Rajhi Banking & Investm	2011	SA	0.996938
Al Rajhi Banking & Investm	2010	SA	1
Al Rajhi Banking & Investm	2009	SA	1
Al Rajhi Banking & Investm	2008	SA	1
Al Rajhi Banking & Investm	2007	SA	1
Al Rajhi Banking & Investm	2006	SA	1
Samba Financial Group	2015	SA	0
Samba Financial Group	2014	SA	0.839409
Samba Financial Group	2013	SA	0.865222
Samba Financial Group	2012	SA	0.904016
Samba Financial Group	2011	SA	0.944335
Samba Financial Group	2010	SA	0.983502
Samba Financial Group	2009	SA	1
Samba Financial Group	2008	SA	0.873274
Samba Financial Group	2007	SA	0.854503
Samba Financial Group	2006	SA	0.876633
Riyad Bank	2015	SA	0
Riyad Bank	2014	SA	0.790894
Riyad Bank	2013	SA	0.792738
Riyad Bank	2012	SA	0.803562
Riyad Bank	2011	SA	0.829007
Riyad Bank	2010	SA	0.877721
Riyad Bank	2009	SA	0.899598
Riyad Bank	2008	SA	0.828067
Riyad Bank	2007	SA	0.957831
Riyad Bank	2006	SA	0.947151
Banque Saudi Fransi JSC	2015	SA	0
Banque Saudi Fransi JSC	2014	SA	0.836296

Banque Saudi Fransi JSC	2013	SA	0.818316
Banque Saudi Fransi JSC	2012	SA	0.812522
Banque Saudi Fransi JSC	2011	SA	0.865474
Banque Saudi Fransi JSC	2010	SA	0.798037
Banque Saudi Fransi JSC	2009	SA	0.842154
Banque Saudi Fransi JSC	2008	SA	0.787088
Banque Saudi Fransi JSC	2007	SA	0.840375
Banque Saudi Fransi JSC	2006	SA	0.816068
Saudi British Bank JSC (The)	2015	SA	0
Saudi British Bank JSC (The)	2014	SA	0.850669
Saudi British Bank JSC (The)	2013	SA	0.883332
Saudi British Bank JSC (The)	2012	SA	0.887365
Saudi British Bank JSC (The)	2011	SA	0.89377
Saudi British Bank JSC (The)	2010	SA	0.860076
Saudi British Bank JSC (The)	2009	SA	0.880811
Saudi British Bank JSC (The)	2008	SA	0.85633
Saudi British Bank JSC (The)	2007	SA	0.877499
Saudi British Bank JSC (The)	2006	SA	0.836215
Arab National Bank Public Joint Stock Company	2015	SA	0
Arab National Bank Public Joint Stock Company	2014	SA	0.896174
Arab National Bank Public Joint Stock Company	2013	SA	0.865691
Arab National Bank Public Joint Stock Company	2012	SA	0.901588
Arab National Bank Public Joint Stock Company	2011	SA	0.858364
Arab National Bank Public Joint Stock Company	2010	SA	0.874823
Arab National Bank Public Joint Stock Company	2009	SA	0.885138
Arab National Bank Public Joint Stock Company	2008	SA	0.87117
Arab National Bank Public Joint Stock Company	2007	SA	0.818045
Arab National Bank Public Joint Stock Company	2006	SA	0.816219
Saudi Hollandi Bank	2015	SA	0
Saudi Hollandi Bank	2014	SA	0.777769
Saudi Hollandi Bank	2013	SA	0.746864
Saudi Hollandi Bank	2012	SA	0.740273
Saudi Hollandi Bank	2011	SA	0.735645
Saudi Hollandi Bank	2010	SA	0.74553
Saudi Hollandi Bank	2009	SA	0.777457
Saudi Hollandi Bank	2008	SA	0.776854
Saudi Hollandi Bank	2007	SA	0.876774
Saudi Hollandi Bank	2006	SA	0.866438
Saudi Investment Bank (The)	2015	SA	0
Saudi Investment Bank (The)	2014	SA	0.787156
Saudi Investment Bank (The)	2013	SA	0.849036
Saudi Investment Bank (The)	2012	SA	0.828286
Saudi Investment Bank (The)	2011	SA	0.857007
Saudi Investment Bank (The)	2010	SA	0.830214
Saudi Investment Bank (The)	2009	SA	0.835035
Saudi Investment Bank (The)	2008	SA	0.83405

Saudi Investment Bank (The)	2007	SA	0.847154
Saudi Investment Bank (The)	2006	SA	0.84206
Islamic Development Bank	2015	SA	0
Islamic Development Bank	2014	SA	0
Islamic Development Bank	2013	SA	0
Islamic Development Bank	2012	SA	0
Islamic Development Bank	2011	SA	0
Islamic Development Bank	2010	SA	0
Islamic Development Bank	2009	SA	0.361194
Islamic Development Bank	2008	SA	0
Islamic Development Bank	2007	SA	0.398172
Islamic Development Bank	2006	SA	0
Alinma Bank Public joint stock company	2015	SA	0
Alinma Bank Public joint stock company	2014	SA	0.858057
Alinma Bank Public joint stock company	2013	SA	0.810141
Alinma Bank Public joint stock company	2012	SA	0.873719
Alinma Bank Public joint stock company	2011	SA	0.97308
Alinma Bank Public joint stock company	2010	SA	0.978476
Alinma Bank Public joint stock company	2009	SA	1
Alinma Bank Public joint stock company	2008	SA	0
Alinma Bank Public joint stock company	2007	SA	0
Alinma Bank Public joint stock company	2006	SA	0
Bank AlJazira JSC	2015	SA	0
Bank AlJazira JSC	2014	SA	0.910071
Bank AlJazira JSC	2013	SA	0.896226
Bank AlJazira JSC	2012	SA	0.892816
Bank AlJazira JSC	2011	SA	0.85935
Bank AlJazira JSC	2010	SA	0.89404
Bank AlJazira JSC	2009	SA	0.938998
Bank AlJazira JSC	2008	SA	0.852175
Bank AlJazira JSC	2007	SA	0.906823
Bank AlJazira JSC	2006	SA	1
Bank AlBilad	2015	SA	0
Bank AlBilad	2014	SA	1
Bank AlBilad	2013	SA	0.942418
Bank AlBilad	2012	SA	0.926819
Bank AlBilad	2011	SA	1
Bank AlBilad	2010	SA	0.845993
Bank AlBilad	2009	SA	0.834613
Bank AlBilad	2008	SA	0.879063
Bank AlBilad	2007	SA	0
Bank AlBilad	2006	SA	0
Qatar National Bank	2015	QA	1
Qatar National Bank	2014	QA	1
Qatar National Bank	2013	QA	1
Qatar National Bank	2012	QA	1

Qatar National Bank	2011	QA	1
Qatar National Bank	2010	QA	1
Qatar National Bank	2009	QA	0.870646
Qatar National Bank	2008	QA	1
Qatar National Bank	2007	QA	1
Qatar National Bank	2006	QA	0
Qatar Islamic Bank SAQ	2015	QA	0.823018
Qatar Islamic Bank SAQ	2014	QA	0.889353
Qatar Islamic Bank SAQ	2013	QA	0.937049
Qatar Islamic Bank SAQ	2012	QA	1
Qatar Islamic Bank SAQ	2011	QA	0.856584
Qatar Islamic Bank SAQ	2010	QA	0.966276
Qatar Islamic Bank SAQ	2009	QA	0.905628
Qatar Islamic Bank SAQ	2008	QA	0.841151
Qatar Islamic Bank SAQ	2007	QA	0.859314
Qatar Islamic Bank SAQ	2006	QA	0
The Commercial Bank (QSC)	2015	QA	1
The Commercial Bank (QSC)	2014	QA	1
The Commercial Bank (QSC)	2013	QA	1
The Commercial Bank (QSC)	2012	QA	0.990946
The Commercial Bank (QSC)	2011	QA	0.943243
The Commercial Bank (QSC)	2010	QA	0.993204
The Commercial Bank (QSC)	2009	QA	1
The Commercial Bank (QSC)	2008	QA	1
The Commercial Bank (QSC)	2007	QA	0.905319
The Commercial Bank (QSC)	2006	QA	0
Doha Bank	2015	QA	0.844139
Doha Bank	2014	QA	0.980486
Doha Bank	2013	QA	0.898908
Doha Bank	2012	QA	1
Doha Bank	2011	QA	1
Doha Bank	2010	QA	1
Doha Bank	2009	QA	1
Doha Bank	2008	QA	0.947206
Doha Bank	2007	QA	0.87962
Doha Bank	2006	QA	0
Masraf Al Rayan (Q.S.C.)	2015	QA	0.587909
Masraf Al Rayan (Q.S.C.)	2014	QA	0.667836
Masraf Al Rayan (Q.S.C.)	2013	QA	0.618889
Masraf Al Rayan (Q.S.C.)	2012	QA	0.666768
Masraf Al Rayan (Q.S.C.)	2011	QA	0.903944
Masraf Al Rayan (Q.S.C.)	2010	QA	0.903041
Masraf Al Rayan (Q.S.C.)	2009	QA	0.688997
Masraf Al Rayan (Q.S.C.)	2008	QA	0.624955
Masraf Al Rayan (Q.S.C.)	2007	QA	0
Masraf Al Rayan (Q.S.C.)	2006	QA	0

Al Khalij Commercial Bank	2015	QA	0.694371
Al Khalij Commercial Bank	2014	QA	0.778329
Al Khalij Commercial Bank	2013	QA	0.782326
Al Khalij Commercial Bank	2012	QA	1
Al Khalij Commercial Bank	2011	QA	0.927398
Al Khalij Commercial Bank	2010	QA	1
Al Khalij Commercial Bank	2009	QA	0.933157
Al Khalij Commercial Bank	2008	QA	1
Al Khalij Commercial Bank	2007	QA	0
Al Khalij Commercial Bank	2006	QA	0
Qatar International Islamic Bank	2015	QA	0.839863
Qatar International Islamic Bank	2014	QA	0.831906
Qatar International Islamic Bank	2013	QA	0.796431
Qatar International Islamic Bank	2012	QA	0.762114
Qatar International Islamic Bank	2011	QA	0.923623
Qatar International Islamic Bank	2010	QA	0.97752
Qatar International Islamic Bank	2009	QA	1
Qatar International Islamic Bank	2008	QA	0
Qatar International Islamic Bank	2007	QA	0
Qatar International Islamic Bank	2006	QA	0
Barwa Bank	2015	QA	0.896844
Barwa Bank	2014	QA	0.954094
Barwa Bank	2013	QA	0.789768
Barwa Bank	2012	QA	0.835239
Barwa Bank	2011	QA	1
Barwa Bank	2010	QA	1
Barwa Bank	2009	QA	0
Barwa Bank	2008	QA	0
Barwa Bank	2007	QA	0
Barwa Bank	2006	QA	0
Ahli Bank QSC	2015	QA	0.615911
Ahli Bank QSC	2014	QA	0.666065
Ahli Bank QSC	2013	QA	0.674179
Ahli Bank QSC	2012	QA	0.657756
Ahli Bank QSC	2011	QA	0.730779
Ahli Bank QSC	2010	QA	0.794104
Ahli Bank QSC	2009	QA	1
Ahli Bank QSC	2008	QA	1
Ahli Bank QSC	2007	QA	0.85182
Ahli Bank QSC	2006	QA	0
International Bank of Qatar Q.S.C.	2015	QA	0.805222
International Bank of Qatar Q.S.C.	2014	QA	0.706638
International Bank of Qatar Q.S.C.	2013	QA	0.791963
International Bank of Qatar Q.S.C.	2012	QA	0.762569
International Bank of Qatar Q.S.C.	2011	QA	0.905611
International Bank of Qatar Q.S.C.	2010	QA	1

International Bank of Qatar Q.S.C.	2009	QA	0.947113
International Bank of Qatar Q.S.C.	2008	QA	0
International Bank of Qatar Q.S.C.	2007	QA	0
International Bank of Qatar Q.S.C.	2006	QA	0
HSBC Bank Middle East Limited	2015	QA	0.921184
HSBC Bank Middle East Limited	2014	QA	0.975826
HSBC Bank Middle East Limited	2013	QA	0.9933
HSBC Bank Middle East Limited	2012	QA	0
HSBC Bank Middle East Limited	2011	QA	0
HSBC Bank Middle East Limited	2010	QA	0
HSBC Bank Middle East Limited	2009	QA	0
HSBC Bank Middle East Limited	2008	QA	0
HSBC Bank Middle East Limited	2007	QA	0
HSBC Bank Middle East Limited	2006	QA	0
Qatar Development Bank Q.S.C.C.	2015	QA	0.834106
Qatar Development Bank Q.S.C.C.	2014	QA	0.873621
Qatar Development Bank Q.S.C.C.	2013	QA	1
Qatar Development Bank Q.S.C.C.	2012	QA	0
Qatar Development Bank Q.S.C.C.	2011	QA	0.95239
Qatar Development Bank Q.S.C.C.	2010	QA	1
Qatar Development Bank Q.S.C.C.	2009	QA	0.95963
Qatar Development Bank Q.S.C.C.	2008	QA	1
Qatar Development Bank Q.S.C.C.	2007	QA	1
Qatar Development Bank Q.S.C.C.	2006	QA	0
Qatar First Bank LLC	2015	QA	0
Qatar First Bank LLC	2014	QA	0
Qatar First Bank LLC	2013	QA	0
Qatar First Bank LLC	2012	QA	0
Qatar First Bank LLC	2011	QA	0
Qatar First Bank LLC	2010	QA	0
Qatar First Bank LLC	2009	QA	0
Qatar First Bank LLC	2008	QA	0
Qatar First Bank LLC	2007	QA	0
Qatar First Bank LLC	2006	QA	0
National Bank of Abu Dhabi	2015	UAE	1
National Bank of Abu Dhabi	2014	UAE	1
National Bank of Abu Dhabi	2013	UAE	0.987245
National Bank of Abu Dhabi	2012	UAE	1
National Bank of Abu Dhabi	2011	UAE	0.92684
National Bank of Abu Dhabi	2010	UAE	0.96552
National Bank of Abu Dhabi	2009	UAE	0.982455
National Bank of Abu Dhabi	2008	UAE	0.927205
National Bank of Abu Dhabi	2007	UAE	1
National Bank of Abu Dhabi	2006	UAE	0.97007
Emirates NBD PJSC	2015	UAE	1
Emirates NBD PJSC	2014	UAE	1

Emirates NBD PJSC	2013	UAE	1
Emirates NBD PJSC	2012	UAE	1
Emirates NBD PJSC	2011	UAE	1
Emirates NBD PJSC	2010	UAE	0.976398
Emirates NBD PJSC	2009	UAE	0.897031
Emirates NBD PJSC	2008	UAE	1
Emirates NBD PJSC	2007	UAE	0.921622
Emirates NBD PJSC	2006	UAE	0.738167
Abu Dhabi Commercial Bank	2015	UAE	0.796863
Abu Dhabi Commercial Bank	2014	UAE	0.781748
Abu Dhabi Commercial Bank	2013	UAE	0.74608
Abu Dhabi Commercial Bank	2012	UAE	0.758879
Abu Dhabi Commercial Bank	2011	UAE	0.731641
Abu Dhabi Commercial Bank	2010	UAE	0.720178
Abu Dhabi Commercial Bank	2009	UAE	0.625792
Abu Dhabi Commercial Bank	2008	UAE	0.68824
Abu Dhabi Commercial Bank	2007	UAE	0.689136
Abu Dhabi Commercial Bank	2006	UAE	0.678065
First Gulf Bank	2015	UAE	0.839466
First Gulf Bank	2014	UAE	0.874445
First Gulf Bank	2013	UAE	0.799007
First Gulf Bank	2012	UAE	0.874035
First Gulf Bank	2011	UAE	0.802634
First Gulf Bank	2010	UAE	0.751361
First Gulf Bank	2009	UAE	0.697704
First Gulf Bank	2008	UAE	1
First Gulf Bank	2007	UAE	0.966312
First Gulf Bank	2006	UAE	0.887702
Dubai Islamic Bank PJSC	2015	UAE	0.848713
Dubai Islamic Bank PJSC	2014	UAE	0.885461
Dubai Islamic Bank PJSC	2013	UAE	0.912089
Dubai Islamic Bank PJSC	2012	UAE	0.967302
Dubai Islamic Bank PJSC	2011	UAE	0.86236
Dubai Islamic Bank PJSC	2010	UAE	0.806893
Dubai Islamic Bank PJSC	2009	UAE	0.849094
Dubai Islamic Bank PJSC	2008	UAE	0.85245
Dubai Islamic Bank PJSC	2007	UAE	1
Dubai Islamic Bank PJSC	2006	UAE	1
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2015	UAE	0.954166
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2014	UAE	0.934616
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2013	UAE	0.994608
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2012	UAE	0.95974
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2011	UAE	1
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2010	UAE	1
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2009	UAE	1
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2008	UAE	0.924522

Abu Dhabi Islamic Bank - Public Joint Stock Co.	2007	UAE	1
Abu Dhabi Islamic Bank - Public Joint Stock Co.	2006	UAE	0.960915
Mashreqbank PSC	2015	UAE	1
Mashreqbank PSC	2014	UAE	0.961516
Mashreqbank PSC	2013	UAE	1
Mashreqbank PSC	2012	UAE	0.975156
Mashreqbank PSC	2011	UAE	1
Mashreqbank PSC	2010	UAE	1
Mashreqbank PSC	2009	UAE	0.975704
Mashreqbank PSC	2008	UAE	0.853984
Mashreqbank PSC	2007	UAE	0.999677
Mashreqbank PSC	2006	UAE	0.870477
Union National Bank	2015	UAE	0.779462
Union National Bank	2014	UAE	0.764952
Union National Bank	2013	UAE	0.793002
Union National Bank	2012	UAE	0.84171
Union National Bank	2011	UAE	0.841427
Union National Bank	2010	UAE	0.904039
Union National Bank	2009	UAE	0.831848
Union National Bank	2008	UAE	0.793411
Union National Bank	2007	UAE	0.835511
Union National Bank	2006	UAE	0.782244
Commercial Bank of Dubai P.S.C.	2015	UAE	0.759428
Commercial Bank of Dubai P.S.C.	2014	UAE	0.727883
Commercial Bank of Dubai P.S.C.	2013	UAE	0.694976
Commercial Bank of Dubai P.S.C.	2012	UAE	0.755996
Commercial Bank of Dubai P.S.C.	2011	UAE	0.759463
Commercial Bank of Dubai P.S.C.	2010	UAE	0.77392
Commercial Bank of Dubai P.S.C.	2009	UAE	0.731189
Commercial Bank of Dubai P.S.C.	2008	UAE	0.724085
Commercial Bank of Dubai P.S.C.	2007	UAE	0.787909
Commercial Bank of Dubai P.S.C.	2006	UAE	0.750957
Emirates Islamic Bank PJSC	2015	UAE	0.819345
Emirates Islamic Bank PJSC	2014	UAE	0.889412
Emirates Islamic Bank PJSC	2013	UAE	0.87947
Emirates Islamic Bank PJSC	2012	UAE	0.963433
Emirates Islamic Bank PJSC	2011	UAE	1
Emirates Islamic Bank PJSC	2010	UAE	0.737803
Emirates Islamic Bank PJSC	2009	UAE	0.741636
Emirates Islamic Bank PJSC	2008	UAE	0.846797
Emirates Islamic Bank PJSC	2007	UAE	0.785598
Emirates Islamic Bank PJSC	2006	UAE	0.711724
Al Hilal Bank PJSC	2015	UAE	1
Al Hilal Bank PJSC	2014	UAE	1
Al Hilal Bank PJSC	2013	UAE	0.953818
Al Hilal Bank PJSC	2012	UAE	0.973592

Al Hilal Bank PJSC	2011	UAE	0.960871
Al Hilal Bank PJSC	2010	UAE	0.877376
Al Hilal Bank PJSC	2009	UAE	1
Al Hilal Bank PJSC	2008	UAE	0
Al Hilal Bank PJSC	2007	UAE	0
Al Hilal Bank PJSC	2006	UAE	0
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2015	UAE	0.975155
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2014	UAE	1
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2013	UAE	1
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2012	UAE	1
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2011	UAE	0.897464
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2010	UAE	0.944669
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2009	UAE	1
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2008	UAE	0
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2007	UAE	0
National Bank of Ras Al-Khaimah (P.S.C.) (The)-RAKBANK	2006	UAE	0
National Bank of Fujairah PJSC	2015	UAE	0.84551
National Bank of Fujairah PJSC	2014	UAE	0.89633
National Bank of Fujairah PJSC	2013	UAE	0.80086
National Bank of Fujairah PJSC	2012	UAE	0.840891
National Bank of Fujairah PJSC	2011	UAE	0.733857
National Bank of Fujairah PJSC	2010	UAE	0.693433
National Bank of Fujairah PJSC	2009	UAE	0.685362
National Bank of Fujairah PJSC	2008	UAE	0.656124
National Bank of Fujairah PJSC	2007	UAE	0.7602
National Bank of Fujairah PJSC	2006	UAE	0.665499
Sharjah Islamic Bank	2015	UAE	0.856582
Sharjah Islamic Bank	2014	UAE	0.828159
Sharjah Islamic Bank	2013	UAE	0.825265
Sharjah Islamic Bank	2012	UAE	0.788474
Sharjah Islamic Bank	2011	UAE	0.801939
Sharjah Islamic Bank	2010	UAE	0.852708
Sharjah Islamic Bank	2009	UAE	0.78485
Sharjah Islamic Bank	2008	UAE	0.736813
Sharjah Islamic Bank	2007	UAE	0.762759
Sharjah Islamic Bank	2006	UAE	0.641051
Noor Bank	2015	UAE	0.879286
Noor Bank	2014	UAE	0.897632
Noor Bank	2013	UAE	0.868784
Noor Bank	2012	UAE	0.920829
Noor Bank	2011	UAE	0.886333
Noor Bank	2010	UAE	0.839375
Noor Bank	2009	UAE	0
Noor Bank	2008	UAE	0
Noor Bank	2007	UAE	0
Noor Bank	2006	UAE	0

Bank of Sharjah	2015	UAE	0.86308
Bank of Sharjah	2014	UAE	0.892783
Bank of Sharjah	2013	UAE	0.799252
Bank of Sharjah	2012	UAE	0.878665
Bank of Sharjah	2011	UAE	0.765344
Bank of Sharjah	2010	UAE	0.685884
Bank of Sharjah	2009	UAE	0.634876
Bank of Sharjah	2008	UAE	0.674728
Bank of Sharjah	2007	UAE	0.622419
Bank of Sharjah	2006	UAE	0.656568
United Arab Bank PJSC	2015	UAE	0.780077
United Arab Bank PJSC	2014	UAE	0.724579
United Arab Bank PJSC	2013	UAE	0.702172
United Arab Bank PJSC	2012	UAE	0.70359
United Arab Bank PJSC	2011	UAE	0.692874
United Arab Bank PJSC	2010	UAE	0
United Arab Bank PJSC	2009	UAE	0
United Arab Bank PJSC	2008	UAE	0
United Arab Bank PJSC	2007	UAE	0
United Arab Bank PJSC	2006	UAE	0
Commercial Bank International P.S.C.	2015	UAE	0.860787
Commercial Bank International P.S.C.	2014	UAE	0.766179
Commercial Bank International P.S.C.	2013	UAE	0.793281
Commercial Bank International P.S.C.	2012	UAE	0.695478
Commercial Bank International P.S.C.	2011	UAE	0.724874
Commercial Bank International P.S.C.	2010	UAE	0.792564
Commercial Bank International P.S.C.	2009	UAE	0.785756
Commercial Bank International P.S.C.	2008	UAE	0.729604
Commercial Bank International P.S.C.	2007	UAE	0.7637
Commercial Bank International P.S.C.	2006	UAE	0.683084
Invest Bank P.S.C.	2015	UAE	0.678687
Invest Bank P.S.C.	2014	UAE	0.661995
Invest Bank P.S.C.	2013	UAE	0.634265
Invest Bank P.S.C.	2012	UAE	0.650243
Invest Bank P.S.C.	2011	UAE	0.608559
Invest Bank P.S.C.	2010	UAE	0.632503
Invest Bank P.S.C.	2009	UAE	0.736012
Invest Bank P.S.C.	2008	UAE	0.654277
Invest Bank P.S.C.	2007	UAE	0.620378
Invest Bank P.S.C.	2006	UAE	0.450805
Arab Bank for Investment & Foreign Trade-Al Masraf	2015	UAE	0.876433
Arab Bank for Investment & Foreign Trade-Al Masraf	2014	UAE	1
Arab Bank for Investment & Foreign Trade-Al Masraf	2013	UAE	0.989144
Arab Bank for Investment & Foreign Trade-Al Masraf	2012	UAE	1
Arab Bank for Investment & Foreign Trade-Al Masraf	2011	UAE	1
Arab Bank for Investment & Foreign Trade-Al Masraf	2010	UAE	1

Arab Bank for Investment & Foreign Trade-Al Masraf	2009	UAE	1
Arab Bank for Investment & Foreign Trade-Al Masraf	2008	UAE	1
Arab Bank for Investment & Foreign Trade-Al Masraf	2007	UAE	1
Arab Bank for Investment & Foreign Trade-Al Masraf	2006	UAE	0.8358
Ajman Bank	2015	UAE	0.725263
Ajman Bank	2014	UAE	0.728735
Ajman Bank	2013	UAE	0.617289
Ajman Bank	2012	UAE	0.627426
Ajman Bank	2011	UAE	0
Ajman Bank	2010	UAE	0
Ajman Bank	2009	UAE	0
Ajman Bank	2008	UAE	0
Ajman Bank	2007	UAE	0
Ajman Bank	2006	UAE	0
National Bank of Umm Al-Qaiwain PSC	2015	UAE	0.611395
National Bank of Umm Al-Qaiwain PSC	2014	UAE	0.589437
National Bank of Umm Al-Qaiwain PSC	2013	UAE	0.614048
National Bank of Umm Al-Qaiwain PSC	2012	UAE	0.617587
National Bank of Umm Al-Qaiwain PSC	2011	UAE	0.609676
National Bank of Umm Al-Qaiwain PSC	2010	UAE	0.633514
National Bank of Umm Al-Qaiwain PSC	2009	UAE	0.659464
National Bank of Umm Al-Qaiwain PSC	2008	UAE	0.614434
National Bank of Umm Al-Qaiwain PSC	2007	UAE	0.736368
National Bank of Umm Al-Qaiwain PSC	2006	UAE	0.355943
Bank Melli Iran	2015	UAE	1
Bank Melli Iran	2014	UAE	0.919013
Bank Melli Iran	2013	UAE	0.915095
Bank Melli Iran	2012	UAE	1
Bank Melli Iran	2011	UAE	0
Bank Melli Iran	2010	UAE	0
Bank Melli Iran	2009	UAE	0
Bank Melli Iran	2008	UAE	0
Bank Melli Iran	2007	UAE	0
Bank Melli Iran	2006	UAE	0
Bank of China Middle East (Dubai) Limited	2015	UAE	0.820891
Bank of China Middle East (Dubai) Limited	2014	UAE	0
Bank of China Middle East (Dubai) Limited	2013	UAE	0
Bank of China Middle East (Dubai) Limited	2012	UAE	0
Bank of China Middle East (Dubai) Limited	2011	UAE	0
Bank of China Middle East (Dubai) Limited	2010	UAE	0
Bank of China Middle East (Dubai) Limited	2009	UAE	0
Bank of China Middle East (Dubai) Limited	2008	UAE	0
Bank of China Middle East (Dubai) Limited	2007	UAE	0
Bank of China Middle East (Dubai) Limited	2006	UAE	0
Ahli United Bank BSC	2015	BAH	1
Ahli United Bank BSC	2014	BAH	1

Ahli United Bank BSC	2013	BAH	0.964098
Ahli United Bank BSC	2012	BAH	1
Ahli United Bank BSC	2011	BAH	0.998475
Ahli United Bank BSC	2010	BAH	0.998227
Ahli United Bank BSC	2009	BAH	0.956968
Ahli United Bank BSC	2008	BAH	0.975626
Ahli United Bank BSC	2007	BAH	0.914955
Ahli United Bank BSC	2006	BAH	0.954803
Arab Banking Corporation BSC-Bank ABC	2015	BAH	0.955245
Arab Banking Corporation BSC-Bank ABC	2014	BAH	1
Arab Banking Corporation BSC-Bank ABC	2013	BAH	1
Arab Banking Corporation BSC-Bank ABC	2012	BAH	0.946966
Arab Banking Corporation BSC-Bank ABC	2011	BAH	1
Arab Banking Corporation BSC-Bank ABC	2010	BAH	0.994924
Arab Banking Corporation BSC-Bank ABC	2009	BAH	0.95744
Arab Banking Corporation BSC-Bank ABC	2008	BAH	1
Arab Banking Corporation BSC-Bank ABC	2007	BAH	1
Arab Banking Corporation BSC-Bank ABC	2006	BAH	0.924783
Albaraka Banking Group B.S.C.	2015	BAH	1
Albaraka Banking Group B.S.C.	2014	BAH	1
Albaraka Banking Group B.S.C.	2013	BAH	1
Albaraka Banking Group B.S.C.	2012	BAH	1
Albaraka Banking Group B.S.C.	2011	BAH	1
Albaraka Banking Group B.S.C.	2010	BAH	1
Albaraka Banking Group B.S.C.	2009	BAH	1
Albaraka Banking Group B.S.C.	2008	BAH	1
Albaraka Banking Group B.S.C.	2007	BAH	1
Albaraka Banking Group B.S.C.	2006	BAH	0.861112
Gulf International Bank BSC	2015	BAH	1
Gulf International Bank BSC	2014	BAH	0.929266
Gulf International Bank BSC	2013	BAH	0.817329
Gulf International Bank BSC	2012	BAH	0.954716
Gulf International Bank BSC	2011	BAH	0.76634
Gulf International Bank BSC	2010	BAH	0.679759
Gulf International Bank BSC	2009	BAH	0.721865
Gulf International Bank BSC	2008	BAH	1
Gulf International Bank BSC	2007	BAH	0.966112
Gulf International Bank BSC	2006	BAH	1
BBK B.S.C.	2015	BAH	0.776331
BBK B.S.C.	2014	BAH	0.768794
BBK B.S.C.	2013	BAH	0.749677
BBK B.S.C.	2012	BAH	0.76518
BBK B.S.C.	2011	BAH	0.738121
BBK B.S.C.	2010	BAH	0.704557
BBK B.S.C.	2009	BAH	0.734425
BBK B.S.C.	2008	BAH	0.678144

BBK B.S.C.	2007	BAH	0.634083
BBK B.S.C.	2006	BAH	0.590625
National Bank of Bahrain	2015	BAH	0.9866
National Bank of Bahrain	2014	BAH	1
National Bank of Bahrain	2013	BAH	0.90557
National Bank of Bahrain	2012	BAH	1
National Bank of Bahrain	2011	BAH	0.865895
National Bank of Bahrain	2010	BAH	0.841445
National Bank of Bahrain	2009	BAH	0.741384
National Bank of Bahrain	2008	BAH	0.80774
National Bank of Bahrain	2007	BAH	0.82219
National Bank of Bahrain	2006	BAH	0.752669
Awal Bank	2015	BAH	0
Awal Bank	2014	BAH	0
Awal Bank	2013	BAH	0
Awal Bank	2012	BAH	0
Awal Bank	2011	BAH	0
Awal Bank	2010	BAH	0
Awal Bank	2009	BAH	0
Awal Bank	2008	BAH	0
Awal Bank	2007	BAH	0
Awal Bank	2006	BAH	0
Ithmaar Bank B.S.C.	2015	BAH	0.885848
Ithmaar Bank B.S.C.	2014	BAH	0.876669
Ithmaar Bank B.S.C.	2013	BAH	0
Ithmaar Bank B.S.C.	2012	BAH	0
Ithmaar Bank B.S.C.	2011	BAH	0
Ithmaar Bank B.S.C.	2010	BAH	0
Ithmaar Bank B.S.C.	2009	BAH	0
Ithmaar Bank B.S.C.	2008	BAH	0
Ithmaar Bank B.S.C.	2007	BAH	0
Ithmaar Bank B.S.C.	2006	BAH	0
Al-Salam Bank-Bahrain B.S.C.	2015	BAH	0.978616
Al-Salam Bank-Bahrain B.S.C.	2014	BAH	1
Al-Salam Bank-Bahrain B.S.C.	2013	BAH	0.709691
Al-Salam Bank-Bahrain B.S.C.	2012	BAH	1
Al-Salam Bank-Bahrain B.S.C.	2011	BAH	0.756685
Al-Salam Bank-Bahrain B.S.C.	2010	BAH	0.786804
Al-Salam Bank-Bahrain B.S.C.	2009	BAH	0.661333
Al-Salam Bank-Bahrain B.S.C.	2008	BAH	0.657763
Al-Salam Bank-Bahrain B.S.C.	2007	BAH	0
Al-Salam Bank-Bahrain B.S.C.	2006	BAH	0
Kuwait Finance House	2015	BAH	0.664493
Kuwait Finance House	2014	BAH	0.652666
Kuwait Finance House	2013	BAH	0.593031
Kuwait Finance House	2012	BAH	0.652409

Kuwait Finance House	2011	BAH	0.582058
Kuwait Finance House	2010	BAH	0.562105
Kuwait Finance House	2009	BAH	0.367179
Kuwait Finance House	2008	BAH	0.474055
Kuwait Finance House	2007	BAH	0.550452
Kuwait Finance House	2006	BAH	0.529396
International Banking Corporation BSC	2015	BAH	0.582714
International Banking Corporation BSC	2014	BAH	0.501759
International Banking Corporation BSC	2013	BAH	0.58198
International Banking Corporation BSC	2012	BAH	0.438995
International Banking Corporation BSC	2011	BAH	0
International Banking Corporation BSC	2010	BAH	0
International Banking Corporation BSC	2009	BAH	0
International Banking Corporation BSC	2008	BAH	0
International Banking Corporation BSC	2007	BAH	0
International Banking Corporation BSC	2006	BAH	0
Arcapita Bank B.S.C.	2015	BAH	0.584066
Arcapita Bank B.S.C.	2014	BAH	0.561566
Arcapita Bank B.S.C.	2013	BAH	1
Arcapita Bank B.S.C.	2012	BAH	0.804706
Arcapita Bank B.S.C.	2011	BAH	1
Arcapita Bank B.S.C.	2010	BAH	0
Arcapita Bank B.S.C.	2009	BAH	0.868413
Arcapita Bank B.S.C.	2008	BAH	0
Arcapita Bank B.S.C.	2007	BAH	0
Arcapita Bank B.S.C.	2006	BAH	0
United Gulf Bank (BSC) EC	2015	BAH	0.522295
United Gulf Bank (BSC) EC	2014	BAH	0.568284
United Gulf Bank (BSC) EC	2013	BAH	0.804843
United Gulf Bank (BSC) EC	2012	BAH	1
United Gulf Bank (BSC) EC	2011	BAH	0.438806
United Gulf Bank (BSC) EC	2010	BAH	0.641693
United Gulf Bank (BSC) EC	2009	BAH	0.888189
United Gulf Bank (BSC) EC	2008	BAH	1
United Gulf Bank (BSC) EC	2007	BAH	0.578145
United Gulf Bank (BSC) EC	2006	BAH	0.610486
Bahrain Islamic Bank B.S.C.	2015	BAH	0.666566
Bahrain Islamic Bank B.S.C.	2014	BAH	0.67468
Bahrain Islamic Bank B.S.C.	2013	BAH	0.749082
Bahrain Islamic Bank B.S.C.	2012	BAH	0.761675
Bahrain Islamic Bank B.S.C.	2011	BAH	0
Bahrain Islamic Bank B.S.C.	2010	BAH	0
Bahrain Islamic Bank B.S.C.	2009	BAH	0
Bahrain Islamic Bank B.S.C.	2008	BAH	0
Bahrain Islamic Bank B.S.C.	2007	BAH	0
Bahrain Islamic Bank B.S.C.	2006	BAH	0

Investcorp Bank BSC	2015	BAH	0.809541
Investcorp Bank BSC	2014	BAH	0.679568
Investcorp Bank BSC	2013	BAH	0.732548
Investcorp Bank BSC	2012	BAH	0.461991
Investcorp Bank BSC	2011	BAH	0.70702
Investcorp Bank BSC	2010	BAH	0.646147
Investcorp Bank BSC	2009	BAH	0.750009
Investcorp Bank BSC	2008	BAH	0.902992
Investcorp Bank BSC	2007	BAH	1
Investcorp Bank BSC	2006	BAH	0.826163
Albaraka Islamic Bank BSC	2015	BAH	0.888489
Albaraka Islamic Bank BSC	2014	BAH	0.958061
Albaraka Islamic Bank BSC	2013	BAH	0.370767
Albaraka Islamic Bank BSC	2012	BAH	1
Albaraka Islamic Bank BSC	2011	BAH	0.333037
Albaraka Islamic Bank BSC	2010	BAH	0
Albaraka Islamic Bank BSC	2009	BAH	0
Albaraka Islamic Bank BSC	2008	BAH	0
Albaraka Islamic Bank BSC	2007	BAH	0
Albaraka Islamic Bank BSC	2006	BAH	0
Khaleeji Commercial Bank	2015	BAH	0.621126
Khaleeji Commercial Bank	2014	BAH	0.62565
Khaleeji Commercial Bank	2013	BAH	0.485656
Khaleeji Commercial Bank	2012	BAH	0.59557
Khaleeji Commercial Bank	2011	BAH	0.47597
Khaleeji Commercial Bank	2010	BAH	0.445868
Khaleeji Commercial Bank	2009	BAH	0.518154
Khaleeji Commercial Bank	2008	BAH	0.561791
Khaleeji Commercial Bank	2007	BAH	0.323027
Khaleeji Commercial Bank	2006	BAH	0.527208
Eskan Bank BSC	2015	BAH	1
Eskan Bank BSC	2014	BAH	0.714696
Eskan Bank BSC	2013	BAH	0.799756
Eskan Bank BSC	2012	BAH	0.997275
Eskan Bank BSC	2011	BAH	0
Eskan Bank BSC	2010	BAH	0
Eskan Bank BSC	2009	BAH	0
Eskan Bank BSC	2008	BAH	0
Eskan Bank BSC	2007	BAH	0
Eskan Bank BSC	2006	BAH	0
Future Bank B.S.C.	2015	BAH	0.704045
Future Bank B.S.C.	2014	BAH	0.844388
Future Bank B.S.C.	2013	BAH	0.677688
Future Bank B.S.C.	2012	BAH	0.856515
Future Bank B.S.C.	2011	BAH	0.656478
Future Bank B.S.C.	2010	BAH	0.92067

Future Bank B.S.C.	2009	BAH	1
Future Bank B.S.C.	2008	BAH	1
Future Bank B.S.C.	2007	BAH	0.962297
Future Bank B.S.C.	2006	BAH	0
Alubaf Arab International Bank	2015	BAH	0.75739
Alubaf Arab International Bank	2014	BAH	0.541387
Alubaf Arab International Bank	2013	BAH	0.550223
Alubaf Arab International Bank	2012	BAH	0.68707
Alubaf Arab International Bank	2011	BAH	0.821143
Alubaf Arab International Bank	2010	BAH	1
Alubaf Arab International Bank	2009	BAH	1
Alubaf Arab International Bank	2008	BAH	0.852437
Alubaf Arab International Bank	2007	BAH	0.0434726
Alubaf Arab International Bank	2006	BAH	0
ABC Islamic Bank (E.C.)	2015	BAH	0.0664504
ABC Islamic Bank (E.C.)	2014	BAH	0.175022
ABC Islamic Bank (E.C.)	2013	BAH	0.100112
ABC Islamic Bank (E.C.)	2012	BAH	0.0731461
ABC Islamic Bank (E.C.)	2011	BAH	0.0816959
ABC Islamic Bank (E.C.)	2010	BAH	0.106864
ABC Islamic Bank (E.C.)	2009	BAH	0.0990925
ABC Islamic Bank (E.C.)	2008	BAH	0.0761289
ABC Islamic Bank (E.C.)	2007	BAH	0.0805775
ABC Islamic Bank (E.C.)	2006	BAH	0.150981
BMI Bank BSC	2015	BAH	0.792724
BMI Bank BSC	2014	BAH	0.651098
BMI Bank BSC	2013	BAH	0.605053
BMI Bank BSC	2012	BAH	0.743968
BMI Bank BSC	2011	BAH	0.868493
BMI Bank BSC	2010	BAH	0.870435
BMI Bank BSC	2009	BAH	1
BMI Bank BSC	2008	BAH	0.742323
BMI Bank BSC	2007	BAH	0.555317
BMI Bank BSC	2006	BAH	0.590622
First energy bank	2015	BAH	0.150827
First energy bank	2014	BAH	0.28078
First energy bank	2013	BAH	0
First energy bank	2012	BAH	0
First energy bank	2011	BAH	0.14135
First energy bank	2010	BAH	0.241156
First energy bank	2009	BAH	0.346353
First energy bank	2008	BAH	1
First energy bank	2007	BAH	0
First energy bank	2006	BAH	0
Bank Alkhair BSC	2015	BAH	1
Bank Alkhair BSC	2014	BAH	0.723808

Bank Alkhair BSC	2013	BAH	0.380179
Bank Alkhair BSC	2012	BAH	0.406274
Bank Alkhair BSC	2011	BAH	0.624486
Bank Alkhair BSC	2010	BAH	0
Bank Alkhair BSC	2009	BAH	0
Bank Alkhair BSC	2008	BAH	1
Bank Alkhair BSC	2007	BAH	0
Bank Alkhair BSC	2006	BAH	0
Bahrain Development Bank B.S.C.	2015	BAH	0.870179
Bahrain Development Bank B.S.C.	2014	BAH	0.942824
Bahrain Development Bank B.S.C.	2013	BAH	0.897452
Bahrain Development Bank B.S.C.	2012	BAH	1
Bahrain Development Bank B.S.C.	2011	BAH	0
Bahrain Development Bank B.S.C.	2010	BAH	0
Bahrain Development Bank B.S.C.	2009	BAH	0.696435
Bahrain Development Bank B.S.C.	2008	BAH	0
Bahrain Development Bank B.S.C.	2007	BAH	0
Bahrain Development Bank B.S.C.	2006	BAH	0
Ibdar Bank BSC	2015	BAH	0.248314
Ibdar Bank BSC	2014	BAH	0.305221
Ibdar Bank BSC	2013	BAH	0
Ibdar Bank BSC	2012	BAH	0.874375
Ibdar Bank BSC	2011	BAH	0
Ibdar Bank BSC	2010	BAH	0
Ibdar Bank BSC	2009	BAH	0
Ibdar Bank BSC	2008	BAH	0
Ibdar Bank BSC	2007	BAH	0
Ibdar Bank BSC	2006	BAH	0
Venture Capital Bank BSC (c)-VCBank	2015	BAH	0.293219
Venture Capital Bank BSC (c)-VCBank	2014	BAH	0.309434
Venture Capital Bank BSC (c)-VCBank	2013	BAH	0
Venture Capital Bank BSC (c)-VCBank	2012	BAH	0.464376
Venture Capital Bank BSC (c)-VCBank	2011	BAH	0
Venture Capital Bank BSC (c)-VCBank	2010	BAH	0
Venture Capital Bank BSC (c)-VCBank	2009	BAH	0
Venture Capital Bank BSC (c)-VCBank	2008	BAH	0
Venture Capital Bank BSC (c)-VCBank	2007	BAH	1
Venture Capital Bank BSC (c)-VCBank	2006	BAH	0.801583
International Investment Bank B.S.C.-IIB	2015	BAH	0
International Investment Bank B.S.C.-IIB	2014	BAH	0.0111217
International Investment Bank B.S.C.-IIB	2013	BAH	0
International Investment Bank B.S.C.-IIB	2012	BAH	0
International Investment Bank B.S.C.-IIB	2011	BAH	0
International Investment Bank B.S.C.-IIB	2010	BAH	0
International Investment Bank B.S.C.-IIB	2009	BAH	0
International Investment Bank B.S.C.-IIB	2008	BAH	0

International Investment Bank B.S.C.-IIB	2007	BAH	0
International Investment Bank B.S.C.-IIB	2006	BAH	0
Seera Investment Bank BSC	2015	BAH	0.455872
Seera Investment Bank BSC	2014	BAH	0.17712
Seera Investment Bank BSC	2013	BAH	0
Seera Investment Bank BSC	2012	BAH	0.47596
Seera Investment Bank BSC	2011	BAH	0
Seera Investment Bank BSC	2010	BAH	0
Seera Investment Bank BSC	2009	BAH	0
Seera Investment Bank BSC	2008	BAH	0
Seera Investment Bank BSC	2007	BAH	0
Seera Investment Bank BSC	2006	BAH	0
TAIB Bank B.S.C.	2015	BAH	1
TAIB Bank B.S.C.	2014	BAH	0.916646
TAIB Bank B.S.C.	2013	BAH	1
TAIB Bank B.S.C.	2012	BAH	1
TAIB Bank B.S.C.	2011	BAH	0.93582
TAIB Bank B.S.C.	2010	BAH	1
TAIB Bank B.S.C.	2009	BAH	0.902118
TAIB Bank B.S.C.	2008	BAH	0.610296
TAIB Bank B.S.C.	2007	BAH	0.703713
TAIB Bank B.S.C.	2006	BAH	0.50879
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2015	BAH	0.694376
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2014	BAH	0.54388
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2013	BAH	0.421793
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2012	BAH	0.389376
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2011	BAH	0.340149
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2010	BAH	0.937392
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2009	BAH	0.945681
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2008	BAH	1
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2007	BAH	0.920342
BMB Investment Bank-Bahrain Middle East Bank B.S.C.	2006	BAH	1
Oasis Capital Bank B.S.C.	2015	BAH	0
Oasis Capital Bank B.S.C.	2014	BAH	0
Oasis Capital Bank B.S.C.	2013	BAH	0
Oasis Capital Bank B.S.C.	2012	BAH	0
Oasis Capital Bank B.S.C.	2011	BAH	0
Oasis Capital Bank B.S.C.	2010	BAH	0
Oasis Capital Bank B.S.C.	2009	BAH	0.95946
Oasis Capital Bank B.S.C.	2008	BAH	0
Oasis Capital Bank B.S.C.	2007	BAH	0
Oasis Capital Bank B.S.C.	2006	BAH	0
Capinnova Investment Bank BSC	2015	BAH	0
Capinnova Investment Bank BSC	2014	BAH	0
Capinnova Investment Bank BSC	2013	BAH	0
Capinnova Investment Bank BSC	2012	BAH	0

Capinnova Investment Bank BSC	2011	BAH	0
Capinnova Investment Bank BSC	2010	BAH	0
Capinnova Investment Bank BSC	2009	BAH	0
Capinnova Investment Bank BSC	2008	BAH	0
Capinnova Investment Bank BSC	2007	BAH	0
Capinnova Investment Bank BSC	2006	BAH	0
Global Banking Corporation BSC	2015	BAH	0
Global Banking Corporation BSC	2014	BAH	0
Global Banking Corporation BSC	2013	BAH	0
Global Banking Corporation BSC	2012	BAH	0
Global Banking Corporation BSC	2011	BAH	0
Global Banking Corporation BSC	2010	BAH	0
Global Banking Corporation BSC	2009	BAH	0
Global Banking Corporation BSC	2008	BAH	0
Global Banking Corporation BSC	2007	BAH	0
Global Banking Corporation BSC	2006	BAH	0
Gulf One investment bank BSC	2015	BAH	0
Gulf One investment bank BSC	2014	BAH	0
Gulf One investment bank BSC	2013	BAH	0
Gulf One investment bank BSC	2012	BAH	0
Gulf One investment bank BSC	2011	BAH	0
Gulf One investment bank BSC	2010	BAH	0
Gulf One investment bank BSC	2009	BAH	0
Gulf One investment bank BSC	2008	BAH	0
Gulf One investment bank BSC	2007	BAH	0
Gulf One investment bank BSC	2006	BAH	0
Investors Bank BSC	2015	BAH	0
Investors Bank BSC	2014	BAH	0
Investors Bank BSC	2013	BAH	0
Investors Bank BSC	2012	BAH	0
Investors Bank BSC	2011	BAH	0
Investors Bank BSC	2010	BAH	0
Investors Bank BSC	2009	BAH	0.193516
Investors Bank BSC	2008	BAH	0.118703
Investors Bank BSC	2007	BAH	0.197776
Investors Bank BSC	2006	BAH	1
Addax Bank BSC	2015	BAH	0
Addax Bank BSC	2014	BAH	0
Addax Bank BSC	2013	BAH	0
Addax Bank BSC	2012	BAH	0
Addax Bank BSC	2011	BAH	0
Addax Bank BSC	2010	BAH	0
Addax Bank BSC	2009	BAH	0
Addax Bank BSC	2008	BAH	0
Addax Bank BSC	2007	BAH	0
Addax Bank BSC	2006	BAH	0

Citi Islamic Investment Bank EC	2015	BAH	0
Citi Islamic Investment Bank EC	2014	BAH	0
Citi Islamic Investment Bank EC	2013	BAH	0
Citi Islamic Investment Bank EC	2012	BAH	0
Citi Islamic Investment Bank EC	2011	BAH	0
Citi Islamic Investment Bank EC	2010	BAH	0
Citi Islamic Investment Bank EC	2009	BAH	0
Citi Islamic Investment Bank EC	2008	BAH	0
Citi Islamic Investment Bank EC	2007	BAH	0
Citi Islamic Investment Bank EC	2006	BAH	0
Arab Bank Group (Combined)	2015	JOR	1
Arab Bank Group (Combined)	2014	JOR	1
Arab Bank Group (Combined)	2013	JOR	1
Arab Bank Group (Combined)	2012	JOR	1
Arab Bank Group (Combined)	2011	JOR	0.977988
Arab Bank Group (Combined)	2010	JOR	1
Arab Bank Group (Combined)	2009	JOR	1
Arab Bank Group (Combined)	2008	JOR	1
Arab Bank Group (Combined)	2007	JOR	0.931076
Arab Bank Group (Combined)	2006	JOR	0.955276
Arab Bank Plc	2015	JOR	0.977088
Arab Bank Plc	2014	JOR	0.998995
Arab Bank Plc	2013	JOR	1
Arab Bank Plc	2012	JOR	0.98337
Arab Bank Plc	2011	JOR	1
Arab Bank Plc	2010	JOR	0.981476
Arab Bank Plc	2009	JOR	0.951923
Arab Bank Plc	2008	JOR	0.932118
Arab Bank Plc	2007	JOR	0.957507
Arab Bank Plc	2006	JOR	1
Housing Bank for Trade & Finance (The)	2015	JOR	1
Housing Bank for Trade & Finance (The)	2014	JOR	0.977046
Housing Bank for Trade & Finance (The)	2013	JOR	0.991784
Housing Bank for Trade & Finance (The)	2012	JOR	0.948468
Housing Bank for Trade & Finance (The)	2011	JOR	1
Housing Bank for Trade & Finance (The)	2010	JOR	0.979717
Housing Bank for Trade & Finance (The)	2009	JOR	0.909042
Housing Bank for Trade & Finance (The)	2008	JOR	0.945349
Housing Bank for Trade & Finance (The)	2007	JOR	0.865096
Housing Bank for Trade & Finance (The)	2006	JOR	0.894842
Jordan Islamic Bank	2015	JOR	1
Jordan Islamic Bank	2014	JOR	1
Jordan Islamic Bank	2013	JOR	1
Jordan Islamic Bank	2012	JOR	0.885879
Jordan Islamic Bank	2011	JOR	0.925031
Jordan Islamic Bank	2010	JOR	0.839024

Jordan Islamic Bank	2009	JOR	0.755337
Jordan Islamic Bank	2008	JOR	0.733261
Jordan Islamic Bank	2007	JOR	0.763941
Jordan Islamic Bank	2006	JOR	0.844637
Jordan Kuwait Bank	2015	JOR	0.704613
Jordan Kuwait Bank	2014	JOR	0.718216
Jordan Kuwait Bank	2013	JOR	0.69576
Jordan Kuwait Bank	2012	JOR	0.621496
Jordan Kuwait Bank	2011	JOR	0.647584
Jordan Kuwait Bank	2010	JOR	0.657866
Jordan Kuwait Bank	2009	JOR	0
Jordan Kuwait Bank	2008	JOR	0
Jordan Kuwait Bank	2007	JOR	0
Jordan Kuwait Bank	2006	JOR	0
Cairo Amman Bank	2015	JOR	1
Cairo Amman Bank	2014	JOR	0.986382
Cairo Amman Bank	2013	JOR	0.937564
Cairo Amman Bank	2012	JOR	0.876232
Cairo Amman Bank	2011	JOR	0.909575
Cairo Amman Bank	2010	JOR	0.956054
Cairo Amman Bank	2009	JOR	0.981769
Cairo Amman Bank	2008	JOR	1
Cairo Amman Bank	2007	JOR	0.905271
Cairo Amman Bank	2006	JOR	0.977531
Jordan Ahli Bank Plc	2015	JOR	1
Jordan Ahli Bank Plc	2014	JOR	0.971992
Jordan Ahli Bank Plc	2013	JOR	0.882335
Jordan Ahli Bank Plc	2012	JOR	0.863505
Jordan Ahli Bank Plc	2011	JOR	0.971268
Jordan Ahli Bank Plc	2010	JOR	1
Jordan Ahli Bank Plc	2009	JOR	0.979759
Jordan Ahli Bank Plc	2008	JOR	1
Jordan Ahli Bank Plc	2007	JOR	1
Jordan Ahli Bank Plc	2006	JOR	1
Bank al Etihad	2015	JOR	0.635051
Bank al Etihad	2014	JOR	0.630775
Bank al Etihad	2013	JOR	0.646183
Bank al Etihad	2012	JOR	0.683861
Bank al Etihad	2011	JOR	0.660426
Bank al Etihad	2010	JOR	0.636969
Bank al Etihad	2009	JOR	0.517508
Bank al Etihad	2008	JOR	0.581676
Bank al Etihad	2007	JOR	0.56271
Bank al Etihad	2006	JOR	0.555986
Bank of Jordan Plc	2015	JOR	0.868905
Bank of Jordan Plc	2014	JOR	0.80146

Bank of Jordan Plc	2013	JOR	0.812122
Bank of Jordan Plc	2012	JOR	0.794288
Bank of Jordan Plc	2011	JOR	0.781187
Bank of Jordan Plc	2010	JOR	0.842942
Bank of Jordan Plc	2009	JOR	0.810935
Bank of Jordan Plc	2008	JOR	0.742411
Bank of Jordan Plc	2007	JOR	0.722407
Bank of Jordan Plc	2006	JOR	0.747511
Capital Bank of Jordan	2015	JOR	0.784264
Capital Bank of Jordan	2014	JOR	0.813615
Capital Bank of Jordan	2013	JOR	0.651661
Capital Bank of Jordan	2012	JOR	0.764687
Capital Bank of Jordan	2011	JOR	0.578365
Capital Bank of Jordan	2010	JOR	0.564416
Capital Bank of Jordan	2009	JOR	0.469991
Capital Bank of Jordan	2008	JOR	0.409595
Capital Bank of Jordan	2007	JOR	0.385314
Capital Bank of Jordan	2006	JOR	0.423235
Arab Jordan Investment Bank	2015	JOR	1
Arab Jordan Investment Bank	2014	JOR	0.915775
Arab Jordan Investment Bank	2013	JOR	0.842862
Arab Jordan Investment Bank	2012	JOR	1
Arab Jordan Investment Bank	2011	JOR	0.870381
Arab Jordan Investment Bank	2010	JOR	0.815012
Arab Jordan Investment Bank	2009	JOR	0.817827
Arab Jordan Investment Bank	2008	JOR	0.712543
Arab Jordan Investment Bank	2007	JOR	0.762722
Arab Jordan Investment Bank	2006	JOR	1
Islamic International Arab Bank	2015	JOR	1
Islamic International Arab Bank	2014	JOR	1
Islamic International Arab Bank	2013	JOR	0.856416
Islamic International Arab Bank	2012	JOR	0.728072
Islamic International Arab Bank	2011	JOR	0.569797
Islamic International Arab Bank	2010	JOR	0.420069
Islamic International Arab Bank	2009	JOR	0.423251
Islamic International Arab Bank	2008	JOR	0.48555
Islamic International Arab Bank	2007	JOR	0.643193
Islamic International Arab Bank	2006	JOR	0.765907
Jordan Commercial Bank	2015	JOR	0.711223
Jordan Commercial Bank	2014	JOR	0.674443
Jordan Commercial Bank	2013	JOR	0.578676
Jordan Commercial Bank	2012	JOR	0.626268
Jordan Commercial Bank	2011	JOR	0.570317
Jordan Commercial Bank	2010	JOR	0.577449
Jordan Commercial Bank	2009	JOR	0.485951
Jordan Commercial Bank	2008	JOR	0.522813

Jordan Commercial Bank	2007	JOR	0.53577
Jordan Commercial Bank	2006	JOR	0.705015
Arab Banking Corporation (Jordan)	2015	JOR	0.642684
Arab Banking Corporation (Jordan)	2014	JOR	0.672228
Arab Banking Corporation (Jordan)	2013	JOR	0.587624
Arab Banking Corporation (Jordan)	2012	JOR	0.600633
Arab Banking Corporation (Jordan)	2011	JOR	0.628358
Arab Banking Corporation (Jordan)	2010	JOR	0.740247
Arab Banking Corporation (Jordan)	2009	JOR	0.75515
Arab Banking Corporation (Jordan)	2008	JOR	0.78169
Arab Banking Corporation (Jordan)	2007	JOR	0.74329
Arab Banking Corporation (Jordan)	2006	JOR	0.684228
Société générale de Banque-Jordanie	2015	JOR	0.815694
Société générale de Banque-Jordanie	2014	JOR	0.855414
Société générale de Banque-Jordanie	2013	JOR	1
Société générale de Banque-Jordanie	2012	JOR	0.987745
Société générale de Banque-Jordanie	2011	JOR	0.97642
Société générale de Banque-Jordanie	2010	JOR	0.730797
Société générale de Banque-Jordanie	2009	JOR	0.619922
Société générale de Banque-Jordanie	2008	JOR	0.693161
Société générale de Banque-Jordanie	2007	JOR	1
Société générale de Banque-Jordanie	2006	JOR	1
Invest Bank	2015	JOR	0.574802
Invest Bank	2014	JOR	0.616675
Invest Bank	2013	JOR	0.878659
Invest Bank	2012	JOR	0.603327
Invest Bank	2011	JOR	0.754996
Invest Bank	2010	JOR	0.680436
Invest Bank	2009	JOR	0.695281
Invest Bank	2008	JOR	0.70714
Invest Bank	2007	JOR	0.821194
Invest Bank	2006	JOR	1
Jordan Dubai Islamic Bank	2015	JOR	1
Jordan Dubai Islamic Bank	2014	JOR	1
Jordan Dubai Islamic Bank	2013	JOR	1
Jordan Dubai Islamic Bank	2012	JOR	0.719399
Jordan Dubai Islamic Bank	2011	JOR	0
Jordan Dubai Islamic Bank	2010	JOR	0
Jordan Dubai Islamic Bank	2009	JOR	0
Jordan Dubai Islamic Bank	2008	JOR	0
Jordan Dubai Islamic Bank	2007	JOR	0
Jordan Dubai Islamic Bank	2006	JOR	0
Egyptian Arab Land Bank	2015	JOR	1
Egyptian Arab Land Bank	2014	JOR	0.947825
Egyptian Arab Land Bank	2013	JOR	0.830917
Egyptian Arab Land Bank	2012	JOR	0.793674

Egyptian Arab Land Bank	2011	JOR	0.773106
Egyptian Arab Land Bank	2010	JOR	0.70618
Egyptian Arab Land Bank	2009	JOR	0.627334
Egyptian Arab Land Bank	2008	JOR	0
Egyptian Arab Land Bank	2007	JOR	0
Egyptian Arab Land Bank	2006	JOR	0
National Bank of Egypt	2015	EGY	1
National Bank of Egypt	2014	EGY	1
National Bank of Egypt	2013	EGY	1
National Bank of Egypt	2012	EGY	1
National Bank of Egypt	2011	EGY	1
National Bank of Egypt	2010	EGY	1
National Bank of Egypt	2009	EGY	0
National Bank of Egypt	2008	EGY	0
National Bank of Egypt	2007	EGY	0
National Bank of Egypt	2006	EGY	0
Banque Misr SAE	2015	EGY	0
Banque Misr SAE	2014	EGY	0
Banque Misr SAE	2013	EGY	0
Banque Misr SAE	2012	EGY	0
Banque Misr SAE	2011	EGY	0
Banque Misr SAE	2010	EGY	0
Banque Misr SAE	2009	EGY	0
Banque Misr SAE	2008	EGY	0
Banque Misr SAE	2007	EGY	0
Banque Misr SAE	2006	EGY	0
Commercial International Bank (Egypt) S.A.E.	2015	EGY	0.893408
Commercial International Bank (Egypt) S.A.E.	2014	EGY	0.860538
Commercial International Bank (Egypt) S.A.E.	2013	EGY	0.783487
Commercial International Bank (Egypt) S.A.E.	2012	EGY	1
Commercial International Bank (Egypt) S.A.E.	2011	EGY	1
Commercial International Bank (Egypt) S.A.E.	2010	EGY	0.913999
Commercial International Bank (Egypt) S.A.E.	2009	EGY	1
Commercial International Bank (Egypt) S.A.E.	2008	EGY	0
Commercial International Bank (Egypt) S.A.E.	2007	EGY	0
Commercial International Bank (Egypt) S.A.E.	2006	EGY	0
QNB Al Ahli	2015	EGY	0.901494
QNB Al Ahli	2014	EGY	0.974622
QNB Al Ahli	2013	EGY	0.991817
QNB Al Ahli	2012	EGY	1
QNB Al Ahli	2011	EGY	1
QNB Al Ahli	2010	EGY	0
QNB Al Ahli	2009	EGY	0
QNB Al Ahli	2008	EGY	0
QNB Al Ahli	2007	EGY	0
QNB Al Ahli	2006	EGY	0

Arab African International Bank	2015	EGY	0.794439
Arab African International Bank	2014	EGY	0.83094
Arab African International Bank	2013	EGY	0.7595
Arab African International Bank	2012	EGY	1
Arab African International Bank	2011	EGY	1
Arab African International Bank	2010	EGY	0.896383
Arab African International Bank	2009	EGY	0
Arab African International Bank	2008	EGY	0
Arab African International Bank	2007	EGY	0
Arab African International Bank	2006	EGY	0
Banque du Caire SAE	2015	EGY	1
Banque du Caire SAE	2014	EGY	1
Banque du Caire SAE	2013	EGY	1
Banque du Caire SAE	2012	EGY	0.984792
Banque du Caire SAE	2011	EGY	0.907357
Banque du Caire SAE	2010	EGY	0
Banque du Caire SAE	2009	EGY	0
Banque du Caire SAE	2008	EGY	0
Banque du Caire SAE	2007	EGY	0
Banque du Caire SAE	2006	EGY	0
HSBC Bank Egypt S A E	2015	EGY	0.975301
HSBC Bank Egypt S A E	2014	EGY	1
HSBC Bank Egypt S A E	2013	EGY	0.846199
HSBC Bank Egypt S A E	2012	EGY	0.94981
HSBC Bank Egypt S A E	2011	EGY	0.99747
HSBC Bank Egypt S A E	2010	EGY	0.982005
HSBC Bank Egypt S A E	2009	EGY	0
HSBC Bank Egypt S A E	2008	EGY	0
HSBC Bank Egypt S A E	2007	EGY	0
HSBC Bank Egypt S A E	2006	EGY	0
Faisal Islamic Bank of Egypt	2015	EGY	1
Faisal Islamic Bank of Egypt	2014	EGY	1
Faisal Islamic Bank of Egypt	2013	EGY	1
Faisal Islamic Bank of Egypt	2012	EGY	1
Faisal Islamic Bank of Egypt	2011	EGY	1
Faisal Islamic Bank of Egypt	2010	EGY	0
Faisal Islamic Bank of Egypt	2009	EGY	0
Faisal Islamic Bank of Egypt	2008	EGY	0
Faisal Islamic Bank of Egypt	2007	EGY	0
Faisal Islamic Bank of Egypt	2006	EGY	0
Bank of Alexandria	2015	EGY	1
Bank of Alexandria	2014	EGY	1
Bank of Alexandria	2013	EGY	0.979008
Bank of Alexandria	2012	EGY	0.956086
Bank of Alexandria	2011	EGY	0.994247
Bank of Alexandria	2010	EGY	0.93702

Bank of Alexandria	2009	EGY	0
Bank of Alexandria	2008	EGY	0
Bank of Alexandria	2007	EGY	0
Bank of Alexandria	2006	EGY	0
Bank Audi SAE	2015	EGY	0
Bank Audi SAE	2014	EGY	0.71933
Bank Audi SAE	2013	EGY	0.622121
Bank Audi SAE	2012	EGY	0.721565
Bank Audi SAE	2011	EGY	0.720804
Bank Audi SAE	2010	EGY	0.862628
Bank Audi SAE	2009	EGY	0.826353
Bank Audi SAE	2008	EGY	0
Bank Audi SAE	2007	EGY	0
Bank Audi SAE	2006	EGY	0
Société Arabe Internationale de Banque-SAIB	2015	EGY	0.657883
Société Arabe Internationale de Banque-SAIB	2014	EGY	0.632121
Société Arabe Internationale de Banque-SAIB	2013	EGY	0.610598
Société Arabe Internationale de Banque-SAIB	2012	EGY	0.663078
Société Arabe Internationale de Banque-SAIB	2011	EGY	0.548709
Société Arabe Internationale de Banque-SAIB	2010	EGY	0.571022
Société Arabe Internationale de Banque-SAIB	2009	EGY	0
Société Arabe Internationale de Banque-SAIB	2008	EGY	0
Société Arabe Internationale de Banque-SAIB	2007	EGY	0
Société Arabe Internationale de Banque-SAIB	2006	EGY	0
Egyptian Arab Land Bank	2015	EGY	0
Egyptian Arab Land Bank	2014	EGY	0
Egyptian Arab Land Bank	2013	EGY	0
Egyptian Arab Land Bank	2012	EGY	0
Egyptian Arab Land Bank	2011	EGY	0
Egyptian Arab Land Bank	2010	EGY	0
Egyptian Arab Land Bank	2009	EGY	0
Egyptian Arab Land Bank	2008	EGY	0
Egyptian Arab Land Bank	2007	EGY	0
Egyptian Arab Land Bank	2006	EGY	0
The National Bank of Kuwait - Egypt SAE-NBK	2015	EGY	0.744346
The National Bank of Kuwait - Egypt SAE-NBK	2014	EGY	0.629616
The National Bank of Kuwait - Egypt SAE-NBK	2013	EGY	0.568867
The National Bank of Kuwait - Egypt SAE-NBK	2012	EGY	0.629785
The National Bank of Kuwait - Egypt SAE-NBK	2011	EGY	0.617632
The National Bank of Kuwait - Egypt SAE-NBK	2010	EGY	0.593833
The National Bank of Kuwait - Egypt SAE-NBK	2009	EGY	0
The National Bank of Kuwait - Egypt SAE-NBK	2008	EGY	0
The National Bank of Kuwait - Egypt SAE-NBK	2007	EGY	0
The National Bank of Kuwait - Egypt SAE-NBK	2006	EGY	0
Ahli United Bank (Egypt) SAE	2015	EGY	0.713682
Ahli United Bank (Egypt) SAE	2014	EGY	0.663653

Ahli United Bank (Egypt) SAE	2013	EGY	0.610924
Ahli United Bank (Egypt) SAE	2012	EGY	0.744456
Ahli United Bank (Egypt) SAE	2011	EGY	0.578488
Ahli United Bank (Egypt) SAE	2010	EGY	0
Ahli United Bank (Egypt) SAE	2009	EGY	0
Ahli United Bank (Egypt) SAE	2008	EGY	0
Ahli United Bank (Egypt) SAE	2007	EGY	0
Ahli United Bank (Egypt) SAE	2006	EGY	0
Emirates National Bank of Dubai SAE	2015	EGY	0
Emirates National Bank of Dubai SAE	2014	EGY	0.956386
Emirates National Bank of Dubai SAE	2013	EGY	1
Emirates National Bank of Dubai SAE	2012	EGY	0
Emirates National Bank of Dubai SAE	2011	EGY	1
Emirates National Bank of Dubai SAE	2010	EGY	0.87406
Emirates National Bank of Dubai SAE	2009	EGY	0.906648
Emirates National Bank of Dubai SAE	2008	EGY	0
Emirates National Bank of Dubai SAE	2007	EGY	0
Emirates National Bank of Dubai SAE	2006	EGY	0
Arab International Bank	2015	EGY	0.646287
Arab International Bank	2014	EGY	0.687219
Arab International Bank	2013	EGY	0.769394
Arab International Bank	2012	EGY	0.642795
Arab International Bank	2011	EGY	0.901611
Arab International Bank	2010	EGY	1
Arab International Bank	2009	EGY	0.937825
Arab International Bank	2008	EGY	0.899135
Arab International Bank	2007	EGY	0
Arab International Bank	2006	EGY	0
Al Baraka Bank Egypt SAE	2015	EGY	0.662009
Al Baraka Bank Egypt SAE	2014	EGY	0.595817
Al Baraka Bank Egypt SAE	2013	EGY	0.546313
Al Baraka Bank Egypt SAE	2012	EGY	0.616899
Al Baraka Bank Egypt SAE	2011	EGY	0.802509
Al Baraka Bank Egypt SAE	2010	EGY	0.752382
Al Baraka Bank Egypt SAE	2009	EGY	0
Al Baraka Bank Egypt SAE	2008	EGY	0
Al Baraka Bank Egypt SAE	2007	EGY	0
Al Baraka Bank Egypt SAE	2006	EGY	0
Abu Dhabi Islamic Bank	2015	EGY	1
Abu Dhabi Islamic Bank	2014	EGY	0.994055
Abu Dhabi Islamic Bank	2013	EGY	1
Abu Dhabi Islamic Bank	2012	EGY	0.998393
Abu Dhabi Islamic Bank	2011	EGY	1
Abu Dhabi Islamic Bank	2010	EGY	0
Abu Dhabi Islamic Bank	2009	EGY	0
Abu Dhabi Islamic Bank	2008	EGY	0

Abu Dhabi Islamic Bank	2007	EGY	0
Abu Dhabi Islamic Bank	2006	EGY	0
Egyptian Gulf Bank SAE	2015	EGY	0.735615
Egyptian Gulf Bank SAE	2014	EGY	0.492849
Egyptian Gulf Bank SAE	2013	EGY	0.508857
Egyptian Gulf Bank SAE	2012	EGY	0.544741
Egyptian Gulf Bank SAE	2011	EGY	0.575084
Egyptian Gulf Bank SAE	2010	EGY	0.49784
Egyptian Gulf Bank SAE	2009	EGY	0
Egyptian Gulf Bank SAE	2008	EGY	0
Egyptian Gulf Bank SAE	2007	EGY	0
Egyptian Gulf Bank SAE	2006	EGY	0
Suez Canal Bank	2015	EGY	0.926631
Suez Canal Bank	2014	EGY	0.897387
Suez Canal Bank	2013	EGY	0.9072
Suez Canal Bank	2012	EGY	0.939793
Suez Canal Bank	2011	EGY	0.760526
Suez Canal Bank	2010	EGY	0
Suez Canal Bank	2009	EGY	0
Suez Canal Bank	2008	EGY	0
Suez Canal Bank	2007	EGY	0
Suez Canal Bank	2006	EGY	0
United Bank (The)	2015	EGY	1
United Bank (The)	2014	EGY	1
United Bank (The)	2013	EGY	0.953658
United Bank (The)	2012	EGY	0.714144
United Bank (The)	2011	EGY	0.889706
United Bank (The)	2010	EGY	0
United Bank (The)	2009	EGY	0
United Bank (The)	2008	EGY	0
United Bank (The)	2007	EGY	0
United Bank (The)	2006	EGY	0
Barclays Bank - Egypt S.A.E.	2015	EGY	0.682839
Barclays Bank - Egypt S.A.E.	2014	EGY	0.636508
Barclays Bank - Egypt S.A.E.	2013	EGY	0.664123
Barclays Bank - Egypt S.A.E.	2012	EGY	0.652748
Barclays Bank - Egypt S.A.E.	2011	EGY	0.618381
Barclays Bank - Egypt S.A.E.	2010	EGY	0.710704
Barclays Bank - Egypt S.A.E.	2009	EGY	0
Barclays Bank - Egypt S.A.E.	2008	EGY	0
Barclays Bank - Egypt S.A.E.	2007	EGY	0
Barclays Bank - Egypt S.A.E.	2006	EGY	0
BLOM Bank Egypt SAE	2015	EGY	0.679354
BLOM Bank Egypt SAE	2014	EGY	0.678864
BLOM Bank Egypt SAE	2013	EGY	0.853386
BLOM Bank Egypt SAE	2012	EGY	0.766603

BLOM Bank Egypt SAE	2011	EGY	0.697745
BLOM Bank Egypt SAE	2010	EGY	0.756326
BLOM Bank Egypt SAE	2009	EGY	0.977033
BLOM Bank Egypt SAE	2008	EGY	0
BLOM Bank Egypt SAE	2007	EGY	0
BLOM Bank Egypt SAE	2006	EGY	0
Union National Bank - Egypt SAE	2015	EGY	0.548351
Union National Bank - Egypt SAE	2014	EGY	0.561366
Union National Bank - Egypt SAE	2013	EGY	0.639155
Union National Bank - Egypt SAE	2012	EGY	0.649857
Union National Bank - Egypt SAE	2011	EGY	0.857478
Union National Bank - Egypt SAE	2010	EGY	1
Union National Bank - Egypt SAE	2009	EGY	1
Union National Bank - Egypt SAE	2008	EGY	1
Union National Bank - Egypt SAE	2007	EGY	0
Union National Bank - Egypt SAE	2006	EGY	0
Nasser Social Bank	2015	EGY	0.486064
Nasser Social Bank	2014	EGY	0.509234
Nasser Social Bank	2013	EGY	1
Nasser Social Bank	2012	EGY	0
Nasser Social Bank	2011	EGY	0
Nasser Social Bank	2010	EGY	0
Nasser Social Bank	2009	EGY	0
Nasser Social Bank	2008	EGY	0
Nasser Social Bank	2007	EGY	0
Nasser Social Bank	2006	EGY	0
Piraeus Bank Egypt SAE	2015	EGY	0.724813
Piraeus Bank Egypt SAE	2014	EGY	0.948585
Piraeus Bank Egypt SAE	2013	EGY	1
Piraeus Bank Egypt SAE	2012	EGY	0.908889
Piraeus Bank Egypt SAE	2011	EGY	1
Piraeus Bank Egypt SAE	2010	EGY	0.8862
Piraeus Bank Egypt SAE	2009	EGY	0.686227
Piraeus Bank Egypt SAE	2008	EGY	0.720972
Piraeus Bank Egypt SAE	2007	EGY	0
Piraeus Bank Egypt SAE	2006	EGY	0
Arab Banking Corporation - Egypt (SAE)	2015	EGY	0.865079
Arab Banking Corporation - Egypt (SAE)	2014	EGY	1
Arab Banking Corporation - Egypt (SAE)	2013	EGY	1
Arab Banking Corporation - Egypt (SAE)	2012	EGY	0.687179
Arab Banking Corporation - Egypt (SAE)	2011	EGY	1
Arab Banking Corporation - Egypt (SAE)	2010	EGY	0.820591
Arab Banking Corporation - Egypt (SAE)	2009	EGY	0
Arab Banking Corporation - Egypt (SAE)	2008	EGY	0
Arab Banking Corporation - Egypt (SAE)	2007	EGY	0
Arab Banking Corporation - Egypt (SAE)	2006	EGY	0

Arab Investment Bank-Federal Arab Bank for Development and Investment	2015	EGY	1
Arab Investment Bank-Federal Arab Bank for Development and Investment	2014	EGY	0.934937
Arab Investment Bank-Federal Arab Bank for Development and Investment	2013	EGY	0.760345
Arab Investment Bank-Federal Arab Bank for Development and Investment	2012	EGY	0.730188
Arab Investment Bank-Federal Arab Bank for Development and Investment	2011	EGY	1
Arab Investment Bank-Federal Arab Bank for Development and Investment	2010	EGY	0
Arab Investment Bank-Federal Arab Bank for Development and Investment	2009	EGY	0
Arab Investment Bank-Federal Arab Bank for Development and Investment	2008	EGY	0
Arab Investment Bank-Federal Arab Bank for Development and Investment	2007	EGY	0
Arab Investment Bank-Federal Arab Bank for Development and Investment	2006	EGY	0
Omdurman National Bank Public Limited Company	2015	SU	0.361916
Omdurman National Bank Public Limited Company	2014	SU	0.295009
Omdurman National Bank Public Limited Company	2013	SU	0.194197
Omdurman National Bank Public Limited Company	2012	SU	0.322788
Omdurman National Bank Public Limited Company	2011	SU	0.219351
Omdurman National Bank Public Limited Company	2010	SU	0.220921
Omdurman National Bank Public Limited Company	2009	SU	0.22893
Omdurman National Bank Public Limited Company	2008	SU	0.203459
Omdurman National Bank Public Limited Company	2007	SU	1
Omdurman National Bank Public Limited Company	2006	SU	0.546084
Bank of Khartoum	2015	SU	0.629212
Bank of Khartoum	2014	SU	0.609639
Bank of Khartoum	2013	SU	0.903264
Bank of Khartoum	2012	SU	0.571345
Bank of Khartoum	2011	SU	0.88769
Bank of Khartoum	2010	SU	0
Bank of Khartoum	2009	SU	0
Bank of Khartoum	2008	SU	0
Bank of Khartoum	2007	SU	0
Bank of Khartoum	2006	SU	0
Faisal Islamic Bank (Sudan)	2015	SU	1
Faisal Islamic Bank (Sudan)	2014	SU	0.774751
Faisal Islamic Bank (Sudan)	2013	SU	0.464838
Faisal Islamic Bank (Sudan)	2012	SU	0.760332
Faisal Islamic Bank (Sudan)	2011	SU	0.319613
Faisal Islamic Bank (Sudan)	2010	SU	0.345397
Faisal Islamic Bank (Sudan)	2009	SU	0.446643
Faisal Islamic Bank (Sudan)	2008	SU	0.411179

Faisal Islamic Bank (Sudan)	2007	SU	0.672144
Faisal Islamic Bank (Sudan)	2006	SU	0.496077
Agricultural Bank of Sudan	2015	SU	0.48338
Agricultural Bank of Sudan	2014	SU	0.695724
Agricultural Bank of Sudan	2013	SU	0
Agricultural Bank of Sudan	2012	SU	0
Agricultural Bank of Sudan	2011	SU	0
Agricultural Bank of Sudan	2010	SU	0
Agricultural Bank of Sudan	2009	SU	0
Agricultural Bank of Sudan	2008	SU	0
Agricultural Bank of Sudan	2007	SU	0
Agricultural Bank of Sudan	2006	SU	0
Tadamon Islamic Bank	2015	SU	0.5392
Tadamon Islamic Bank	2014	SU	0.895257
Tadamon Islamic Bank	2013	SU	0.829782
Tadamon Islamic Bank	2012	SU	0.739298
Tadamon Islamic Bank	2011	SU	1
Tadamon Islamic Bank	2010	SU	1
Tadamon Islamic Bank	2009	SU	0.48069
Tadamon Islamic Bank	2008	SU	0.447216
Tadamon Islamic Bank	2007	SU	0.417192
Tadamon Islamic Bank	2006	SU	0.34005
Elnilein Bank	2015	SU	0
Elnilein Bank	2014	SU	0
Elnilein Bank	2013	SU	0
Elnilein Bank	2012	SU	0
Elnilein Bank	2011	SU	0
Elnilein Bank	2010	SU	0.424067
Elnilein Bank	2009	SU	0.39254
Elnilein Bank	2008	SU	0.314899
Elnilein Bank	2007	SU	0.36939
Elnilein Bank	2006	SU	0.537288
Sudanese French Bank Public Limited Company (The)	2015	SU	0.631088
Sudanese French Bank Public Limited Company (The)	2014	SU	0.784603
Sudanese French Bank Public Limited Company (The)	2013	SU	0.847755
Sudanese French Bank Public Limited Company (The)	2012	SU	0.790396
Sudanese French Bank Public Limited Company (The)	2011	SU	0.726931
Sudanese French Bank Public Limited Company (The)	2010	SU	0.738
Sudanese French Bank Public Limited Company (The)	2009	SU	0.782834
Sudanese French Bank Public Limited Company (The)	2008	SU	0.773807
Sudanese French Bank Public Limited Company (The)	2007	SU	0.833907
Sudanese French Bank Public Limited Company (The)	2006	SU	1
AlNile Bank for Commerce & Development	2015	SU	0
AlNile Bank for Commerce & Development	2014	SU	0
AlNile Bank for Commerce & Development	2013	SU	0
AlNile Bank for Commerce & Development	2012	SU	0

AlNile Bank for Commerce & Development	2011	SU	0
AlNile Bank for Commerce & Development	2010	SU	0
AlNile Bank for Commerce & Development	2009	SU	0.739281
AlNile Bank for Commerce & Development	2008	SU	0.619983
AlNile Bank for Commerce & Development	2007	SU	0.80159
AlNile Bank for Commerce & Development	2006	SU	1
Farmers Commercial Bank	2015	SU	0.389771
Farmers Commercial Bank	2014	SU	0.501198
Farmers Commercial Bank	2013	SU	0.49782
Farmers Commercial Bank	2012	SU	0
Farmers Commercial Bank	2011	SU	0.495898
Farmers Commercial Bank	2010	SU	0.634795
Farmers Commercial Bank	2009	SU	0.598088
Farmers Commercial Bank	2008	SU	1
Farmers Commercial Bank	2007	SU	1
Farmers Commercial Bank	2006	SU	1
Al Baraka Bank Sudan Public Limited Company	2015	SU	0.553058
Al Baraka Bank Sudan Public Limited Company	2014	SU	0.511179
Al Baraka Bank Sudan Public Limited Company	2013	SU	0.763402
Al Baraka Bank Sudan Public Limited Company	2012	SU	0.655093
Al Baraka Bank Sudan Public Limited Company	2011	SU	0.823324
Al Baraka Bank Sudan Public Limited Company	2010	SU	0.830333
Al Baraka Bank Sudan Public Limited Company	2009	SU	0.737793
Al Baraka Bank Sudan Public Limited Company	2008	SU	0.971002
Al Baraka Bank Sudan Public Limited Company	2007	SU	1
Al Baraka Bank Sudan Public Limited Company	2006	SU	1
Blue Nile Mashreq Bank Ltd	2015	SU	1
Blue Nile Mashreq Bank Ltd	2014	SU	0.870271
Blue Nile Mashreq Bank Ltd	2013	SU	1
Blue Nile Mashreq Bank Ltd	2012	SU	0.777282
Blue Nile Mashreq Bank Ltd	2011	SU	1
Blue Nile Mashreq Bank Ltd	2010	SU	0.84079
Blue Nile Mashreq Bank Ltd	2009	SU	0.572664
Blue Nile Mashreq Bank Ltd	2008	SU	1
Blue Nile Mashreq Bank Ltd	2007	SU	0
Blue Nile Mashreq Bank Ltd	2006	SU	0.643375
Al Salam Bank	2015	SU	0.314022
Al Salam Bank	2014	SU	0.339485
Al Salam Bank	2013	SU	0.287127
Al Salam Bank	2012	SU	0.432861
Al Salam Bank	2011	SU	0.223132
Al Salam Bank	2010	SU	0.214812
Al Salam Bank	2009	SU	0.239252
Al Salam Bank	2008	SU	0.210269
Al Salam Bank	2007	SU	0.258014
Al Salam Bank	2006	SU	0

United Capital Bank	2015	SU	0.244598
United Capital Bank	2014	SU	0.251842
United Capital Bank	2013	SU	0.319933
United Capital Bank	2012	SU	0.269885
United Capital Bank	2011	SU	0.328283
United Capital Bank	2010	SU	0.29486
United Capital Bank	2009	SU	0.229824
United Capital Bank	2008	SU	0
United Capital Bank	2007	SU	0
United Capital Bank	2006	SU	0
Sudanese Islamic Bank	2015	SU	0.569129
Sudanese Islamic Bank	2014	SU	0.652048
Sudanese Islamic Bank	2013	SU	0.55718
Sudanese Islamic Bank	2012	SU	0.672677
Sudanese Islamic Bank	2011	SU	0.537842
Sudanese Islamic Bank	2010	SU	0
Sudanese Islamic Bank	2009	SU	0
Sudanese Islamic Bank	2008	SU	0
Sudanese Islamic Bank	2007	SU	0
Sudanese Islamic Bank	2006	SU	0
Al Shamal Islamic Bank	2015	SU	0.651623
Al Shamal Islamic Bank	2014	SU	0.538238
Al Shamal Islamic Bank	2013	SU	0.548222
Al Shamal Islamic Bank	2012	SU	0.692395
Al Shamal Islamic Bank	2011	SU	0.457306
Al Shamal Islamic Bank	2010	SU	0.373402
Al Shamal Islamic Bank	2009	SU	0.34223
Al Shamal Islamic Bank	2008	SU	0.318493
Al Shamal Islamic Bank	2007	SU	1
Al Shamal Islamic Bank	2006	SU	1
Animal Resources Bank	2015	SU	0
Animal Resources Bank	2014	SU	0
Animal Resources Bank	2013	SU	0.32235
Animal Resources Bank	2012	SU	0.298267
Animal Resources Bank	2011	SU	0.359026
Animal Resources Bank	2010	SU	0.413072
Animal Resources Bank	2009	SU	0.514325
Animal Resources Bank	2008	SU	0
Animal Resources Bank	2007	SU	0
Animal Resources Bank	2006	SU	0
Saudi Sudanese Bank	2015	SU	0.568503
Saudi Sudanese Bank	2014	SU	0.539156
Saudi Sudanese Bank	2013	SU	0.591935
Saudi Sudanese Bank	2012	SU	0.652575
Saudi Sudanese Bank	2011	SU	1
Saudi Sudanese Bank	2010	SU	0.868366

Saudi Sudanese Bank	2009	SU	0.762178
Saudi Sudanese Bank	2008	SU	0.587029
Saudi Sudanese Bank	2007	SU	0.653963
Saudi Sudanese Bank	2006	SU	0.467855
Byblos Bank Africa Ltd	2015	SU	0
Byblos Bank Africa Ltd	2014	SU	0
Byblos Bank Africa Ltd	2013	SU	0
Byblos Bank Africa Ltd	2012	SU	0
Byblos Bank Africa Ltd	2011	SU	0
Byblos Bank Africa Ltd	2010	SU	0
Byblos Bank Africa Ltd	2009	SU	1
Byblos Bank Africa Ltd	2008	SU	0.801948
Byblos Bank Africa Ltd	2007	SU	1
Byblos Bank Africa Ltd	2006	SU	0
Industrial Development Bank	2015	SU	0.321257
Industrial Development Bank	2014	SU	0.291967
Industrial Development Bank	2013	SU	0.628454
Industrial Development Bank	2012	SU	0.342719
Industrial Development Bank	2011	SU	0.654112
Industrial Development Bank	2010	SU	0
Industrial Development Bank	2009	SU	0
Industrial Development Bank	2008	SU	0
Industrial Development Bank	2007	SU	0
Industrial Development Bank	2006	SU	0
National Bank of Sudan	2015	SU	0.23568
National Bank of Sudan	2014	SU	0.295357
National Bank of Sudan	2013	SU	0.323256
National Bank of Sudan	2012	SU	0.287267
National Bank of Sudan	2011	SU	0.578943
National Bank of Sudan	2010	SU	0.421928
National Bank of Sudan	2009	SU	0.615354
National Bank of Sudan	2008	SU	0
National Bank of Sudan	2007	SU	0
National Bank of Sudan	2006	SU	0
Savings & Social Development Bank	2015	SU	0.729947
Savings & Social Development Bank	2014	SU	0.722206
Savings & Social Development Bank	2013	SU	0.546352
Savings & Social Development Bank	2012	SU	0.617268
Savings & Social Development Bank	2011	SU	0.481238
Savings & Social Development Bank	2010	SU	0.532513
Savings & Social Development Bank	2009	SU	0.816599
Savings & Social Development Bank	2008	SU	0.808768
Savings & Social Development Bank	2007	SU	0
Savings & Social Development Bank	2006	SU	0
Export Development Bank	2015	SU	0.454891
Export Development Bank	2014	SU	0.447846

Export Development Bank	2013	SU	0
Export Development Bank	2012	SU	0.566346
Export Development Bank	2011	SU	0.403359
Export Development Bank	2010	SU	0.448299
Export Development Bank	2009	SU	0.412377
Export Development Bank	2008	SU	0.444021
Export Development Bank	2007	SU	0.489405
Export Development Bank	2006	SU	0.405292
Al Jazeera Sudanese Jordanian Bank	2015	SU	0.596588
Al Jazeera Sudanese Jordanian Bank	2014	SU	0.644122
Al Jazeera Sudanese Jordanian Bank	2013	SU	1
Al Jazeera Sudanese Jordanian Bank	2012	SU	0.490004
Al Jazeera Sudanese Jordanian Bank	2011	SU	0.822773
Al Jazeera Sudanese Jordanian Bank	2010	SU	0.798825
Al Jazeera Sudanese Jordanian Bank	2009	SU	1
Al Jazeera Sudanese Jordanian Bank	2008	SU	0
Al Jazeera Sudanese Jordanian Bank	2007	SU	0
Al Jazeera Sudanese Jordanian Bank	2006	SU	0
Sudanese Egyptian Bank	2015	SU	0.469046
Sudanese Egyptian Bank	2014	SU	0.487959
Sudanese Egyptian Bank	2013	SU	0.624776
Sudanese Egyptian Bank	2012	SU	0.605579
Sudanese Egyptian Bank	2011	SU	0.456868
Sudanese Egyptian Bank	2010	SU	0.479839
Sudanese Egyptian Bank	2009	SU	0.51734
Sudanese Egyptian Bank	2008	SU	0.530738
Sudanese Egyptian Bank	2007	SU	0
Sudanese Egyptian Bank	2006	SU	1
Workers' National Bank	2015	SU	0.365392
Workers' National Bank	2014	SU	0.298359
Workers' National Bank	2013	SU	0.306872
Workers' National Bank	2012	SU	0.345835
Workers' National Bank	2011	SU	0.738087
Workers' National Bank	2010	SU	1
Workers' National Bank	2009	SU	1
Workers' National Bank	2008	SU	1
Workers' National Bank	2007	SU	0
Workers' National Bank	2006	SU	0
Arab Sudanese Bank Co Ltd	2015	SU	0.625114
Arab Sudanese Bank Co Ltd	2014	SU	0
Arab Sudanese Bank Co Ltd	2013	SU	0
Arab Sudanese Bank Co Ltd	2012	SU	0
Arab Sudanese Bank Co Ltd	2011	SU	0
Arab Sudanese Bank Co Ltd	2010	SU	0
Arab Sudanese Bank Co Ltd	2009	SU	0
Arab Sudanese Bank Co Ltd	2008	SU	0

Arab Sudanese Bank Co Ltd	2007	SU	0
Arab Sudanese Bank Co Ltd	2006	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2015	SU	0.36712
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2014	SU	0.269185
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2013	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2012	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2011	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2010	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2009	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2008	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2007	SU	0
Banque Sahelo-Saharienne pour L'Investissement et le Commerce-Soudan	2006	SU	0
Real Estate Commercial Bank	2015	SU	0
Real Estate Commercial Bank	2014	SU	0
Real Estate Commercial Bank	2013	SU	0
Real Estate Commercial Bank	2012	SU	0
Real Estate Commercial Bank	2011	SU	0
Real Estate Commercial Bank	2010	SU	0
Real Estate Commercial Bank	2009	SU	0
Real Estate Commercial Bank	2008	SU	0
Real Estate Commercial Bank	2007	SU	0
Real Estate Commercial Bank	2006	SU	0
Turkiye is Bankasi A.S. - ISBANK	2015	TUR	1
	2014	TUR	1
	2013	TUR	1
	2012	TUR	1
	2011	TUR	0.92731
	2010	TUR	1
	2009	TUR	1
	2008	TUR	0.979958
	2007	TUR	1
	2006	TUR	1
T.C. Ziraat Bankasi A.S.	2015	TUR	1
	2014	TUR	1
	2013	TUR	1
	2012	TUR	0.973948
	2011	TUR	0.939571
	2010	TUR	1

	2009	TUR	1
	2008	TUR	1
	2007	TUR	0
	2006	TUR	0
Turkiye Garanti Bankasi A.S.	2015	TUR	0.96286
	2014	TUR	0.950533
	2013	TUR	0.972816
	2012	TUR	0.918658
	2011	TUR	0.927854
	2010	TUR	0.871661
	2009	TUR	0.864981
	2008	TUR	0.902489
	2007	TUR	0.943551
	2006	TUR	0.884302
Haci Omer Sabanci Holding AS	2015	TUR	0.973478
	2014	TUR	0.982125
	2013	TUR	1
	2012	TUR	0.93075
	2011	TUR	1
	2010	TUR	1
	2009	TUR	1
	2008	TUR	0.978767
	2007	TUR	0
	2006	TUR	0
Akbank T.A.S.	2015	TUR	0.863352
	2014	TUR	0.913468
	2013	TUR	0.925258
	2012	TUR	0.865291
	2011	TUR	0.824627
	2010	TUR	0.785272
	2009	TUR	0.821762
	2008	TUR	0.880682
	2007	TUR	0.755973
	2006	TUR	0.812525
Yapi Ve Kredi Bankasi A.S.	2015	TUR	0.949508
	2014	TUR	1
	2013	TUR	0.9607
	2012	TUR	0.958677
	2011	TUR	0.935221
	2010	TUR	0.92303
	2009	TUR	0.930577
	2008	TUR	0.99525
	2007	TUR	1
	2006	TUR	1
Turkiye Vakiflar Bankasi TAO	2015	TUR	1
	2014	TUR	1

	2013	TUR	0.95239
	2012	TUR	0.971245
	2011	TUR	0.925347
	2010	TUR	0.885097
	2009	TUR	1
	2008	TUR	0.947945
	2007	TUR	0.926456
	2006	TUR	1
Turkiye Halk Bankasi A.S.	2015	TUR	1
	2014	TUR	0.975311
	2013	TUR	0.961587
	2012	TUR	0.982472
	2011	TUR	0.927119
	2010	TUR	0.906002
	2009	TUR	0.891631
	2008	TUR	0.92524
	2007	TUR	0.935347
	2006	TUR	1
Koç Financial Services-KOC Finansal Hizmetler AS	2015	TUR	0.992511
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Denizbank A.S.	2015	TUR	0.985997
	2014	TUR	1
	2013	TUR	0.97935
	2012	TUR	0.951
	2011	TUR	0.875418
	2010	TUR	0.820934
	2009	TUR	0.83585
	2008	TUR	0.845317
	2007	TUR	0.862338
	2006	TUR	0.960804
Finansbank A.S.	2015	TUR	0.885847
	2014	TUR	0.954556
	2013	TUR	0.874043
	2012	TUR	0.882488
	2011	TUR	0.829294
	2010	TUR	0.834377
	2009	TUR	0.856649
	2008	TUR	0.808461

	2007	TUR	0.870561
	2006	TUR	0.787365
Turk Ekonomi Bankasi A.S.	2015	TUR	1
	2014	TUR	1
	2013	TUR	0.986175
	2012	TUR	0.927309
	2011	TUR	0.854047
	2010	TUR	0.818155
	2009	TUR	0.947852
	2008	TUR	1
	2007	TUR	0.975148
	2006	TUR	0.846716
ING Bank A.S.	2015	TUR	0.666881
	2014	TUR	0.817895
	2013	TUR	0.771629
	2012	TUR	0.875385
	2011	TUR	0.743356
	2010	TUR	0.784207
	2009	TUR	0.802787
	2008	TUR	0.764727
	2007	TUR	0.827286
	2006	TUR	0
Fiba Holding AS	2015	TUR	0.841222
	2014	TUR	0.862864
	2013	TUR	0.957001
	2012	TUR	0.914324
	2011	TUR	0.869008
	2010	TUR	0.910866
	2009	TUR	0.992672
	2008	TUR	0.850859
	2007	TUR	0.72737
	2006	TUR	0.619298
Kuveyt Turk Katilim Bankasi A.S.-Kuwait Turkish Participation Bank Inc	2015	TUR	1
	2014	TUR	0.993102
	2013	TUR	0.917379
	2012	TUR	1
	2011	TUR	1
	2010	TUR	1
	2009	TUR	0.984038
	2008	TUR	1
	2007	TUR	1
	2006	TUR	0.933357
Turkiye Ihracat Kredi Bankasi - Turk Eximbank-Export Credit Bank of Turkey	2015	TUR	1
	2014	TUR	0.783653

	2013	TUR	0.342268
	2012	TUR	0.46822
	2011	TUR	0.197999
	2010	TUR	0.264199
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0.173795
	2006	TUR	0.147546
Turkiye Finans Katilim Bankasi AS	2015	TUR	0.860319
	2014	TUR	0.808896
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Odea Bank AS	2015	TUR	0.950605
	2014	TUR	0.764913
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
HSBC Bank A.S.	2015	TUR	0.720683
	2014	TUR	0.831192
	2013	TUR	0.805756
	2012	TUR	0.910473
	2011	TUR	0.827046
	2010	TUR	0.950585
	2009	TUR	1
	2008	TUR	1
	2007	TUR	1
	2006	TUR	0
Albaraka Turk Participation Bank-Albaraka Turk Katilim Bankasi AS	2015	TUR	0.866039
	2014	TUR	0.910006
	2013	TUR	0.917871
	2012	TUR	0.957972
	2011	TUR	0.929118
	2010	TUR	0.8808
	2009	TUR	0.855064

	2008	TUR	0.877037
	2007	TUR	1
	2006	TUR	0
Sekerbank T.A.S.	2015	TUR	0.897858
	2014	TUR	1
	2013	TUR	0.8508
	2012	TUR	0.892522
	2011	TUR	0.765581
	2010	TUR	0.814191
	2009	TUR	0.845168
	2008	TUR	0.890644
	2007	TUR	1
	2006	TUR	1
Turkiye Sinai Kalkinma Bankasi A.S.-Industrial Development Bank of Turkey	2015	TUR	0
	2014	TUR	0.139842
	2013	TUR	0.130919
	2012	TUR	0.142241
	2011	TUR	0.136795
	2010	TUR	0.179198
	2009	TUR	0.181135
	2008	TUR	0.178372
	2007	TUR	0
	2006	TUR	0
Iller Bankasi A.S.	2015	TUR	0
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Asya Katilim Bankasi AS-Bank Asya	2015	TUR	1
	2014	TUR	0.96672
	2013	TUR	1
	2012	TUR	0.910508
	2011	TUR	1
	2010	TUR	1
	2009	TUR	1
	2008	TUR	0.928776
	2007	TUR	0
	2006	TUR	0
Anadolubank A.S.	2015	TUR	0.743627
	2014	TUR	0.715314

	2013	TUR	0.691833
	2012	TUR	0.649883
	2011	TUR	0.647953
	2010	TUR	0.629413
	2009	TUR	0.642061
	2008	TUR	0.72226
	2007	TUR	0.604923
	2006	TUR	0.576418
Alternatifbank A.S.	2015	TUR	0.531545
	2014	TUR	0.557074
	2013	TUR	0.5948
	2012	TUR	0.583793
	2011	TUR	0.586702
	2010	TUR	0.605668
	2009	TUR	0.672638
	2008	TUR	0.635699
	2007	TUR	0.499403
	2006	TUR	0.418584
Burgan Bank AS	2015	TUR	0.531998
	2014	TUR	0.535
	2013	TUR	0.542947
	2012	TUR	0.553831
	2011	TUR	0.516766
	2010	TUR	0.614998
	2009	TUR	0.596984
	2008	TUR	0.554055
	2007	TUR	0.418842
	2006	TUR	0.448202
Fibabanka As	2015	TUR	0.686067
	2014	TUR	0.644738
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Citibank A.S.	2015	TUR	0.634814
	2014	TUR	0.652933
	2013	TUR	0.632332
	2012	TUR	0.794952
	2011	TUR	0.901536
	2010	TUR	0.84733
	2009	TUR	0.845441
	2008	TUR	1

	2007	TUR	1
	2006	TUR	0
Aktif Yatirim Bankasi AS	2015	TUR	0.749015
	2014	TUR	0.638649
	2013	TUR	0.544062
	2012	TUR	0.207874
	2011	TUR	0.401118
	2010	TUR	0.450414
	2009	TUR	0.285957
	2008	TUR	0.186358
	2007	TUR	1
	2006	TUR	0.692994
Mercedes-Benz Finansman Turk AS	2015	TUR	0
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Yapi Kredi Finansal Kiralama A.O.	2015	TUR	0.248209
	2014	TUR	0.209215
	2013	TUR	0.530719
	2012	TUR	0.966326
	2011	TUR	0.374977
	2010	TUR	0.236385
	2009	TUR	0.177669
	2008	TUR	1
	2007	TUR	0.376189
	2006	TUR	0.181514
Takasbank	2015	TUR	0.739381
	2014	TUR	0.760737
	2013	TUR	0.906745
	2012	TUR	0
	2011	TUR	1
	2010	TUR	1
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Garanti Finansal Kiralama	2015	TUR	1
	2014	TUR	1
	2013	TUR	1
	2012	TUR	1

	2011	TUR	1
	2010	TUR	0.606029
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Is Yatirim Menkul Degerler AS-Is Investment	2015	TUR	0.858096
	2014	TUR	0.969109
	2013	TUR	1
	2012	TUR	0.997677
	2011	TUR	0.945073
	2010	TUR	0.85947
	2009	TUR	0.5613
	2008	TUR	0.918608
	2007	TUR	0.826241
	2006	TUR	0.517362
Turkland Bank AS-T- Bank	2015	TUR	0.568337
	2014	TUR	0.537285
	2013	TUR	0.449756
	2012	TUR	0.47379
	2011	TUR	0.478021
	2010	TUR	0.629134
	2009	TUR	0.399077
	2008	TUR	0.285513
	2007	TUR	0.265307
	2006	TUR	0.289243
Is Finansal Kiralama AS	2015	TUR	0.446057
	2014	TUR	0.313692
	2013	TUR	0.450743
	2012	TUR	0.263924
	2011	TUR	0.367169
	2010	TUR	0.53411
	2009	TUR	0.434771
	2008	TUR	0.438714
	2007	TUR	0.311759
	2006	TUR	0.283873
Volkswagen Dogus Finansmani AS	2015	TUR	0
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0.79255
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0.622741
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0

GSD Holding Anonim Sirketi	2015	TUR	1
	2014	TUR	0.58558
	2013	TUR	0.672412
	2012	TUR	0.672986
	2011	TUR	0.637295
	2010	TUR	0.740265
	2009	TUR	0.821169
	2008	TUR	0.70128
	2007	TUR	0
	2006	TUR	0
AK Finansal Kiralama AS	2015	TUR	0.153819
	2014	TUR	0.413399
	2013	TUR	0.298435
	2012	TUR	0.576971
	2011	TUR	0.860373
	2010	TUR	0.885622
	2009	TUR	0.919919
	2008	TUR	1
	2007	TUR	1
	2006	TUR	0.20368
Development Bank of Turkey Inc-Turkiye Kalkinma Bankasi A.S.	2015	TUR	0.326726
	2014	TUR	0.328747
	2013	TUR	0.348977
	2012	TUR	0.414672
	2011	TUR	0.337147
	2010	TUR	0.469617
	2009	TUR	0.526909
	2008	TUR	0.559159
	2007	TUR	0
	2006	TUR	0
ICBC Turkey Bank A S.	2015	TUR	0.549604
	2014	TUR	0.554393
	2013	TUR	0.658414
	2012	TUR	0.679078
	2011	TUR	0.659587
	2010	TUR	0.665804
	2009	TUR	0.816889
	2008	TUR	0.719905
	2007	TUR	0.690882
	2006	TUR	0.746904
Arab Turkish Bank-Arap Turk Bankasi	2015	TUR	0.606258
	2014	TUR	0.65779
	2013	TUR	0.692872
	2012	TUR	0.508923
	2011	TUR	0.615752

	2010	TUR	0.416452
	2009	TUR	0.34849
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Yapi Kredi Yatirim Menkul Degerler A.S.	2015	TUR	1
	2014	TUR	0.986963
	2013	TUR	0.749505
	2012	TUR	0.711867
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Bank of Tokyo-Mitsubishi UFJ Turkey A.S.	2015	TUR	1
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Yapi Kredi Factoring AS	2015	TUR	0.823211
	2014	TUR	0.503341
	2013	TUR	0.390904
	2012	TUR	0.406204
	2011	TUR	0.478905
	2010	TUR	0.419627
	2009	TUR	0.384033
	2008	TUR	0.337839
	2007	TUR	0.362381
	2006	TUR	0.245837
Koc Tuketici Finansmani A.S.	2015	TUR	0.29853
	2014	TUR	0.268577
	2013	TUR	0.281128
	2012	TUR	0.399977
	2011	TUR	0.275718
	2010	TUR	0.442446
	2009	TUR	0.76119
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Deutsche Bank AS	2015	TUR	0.423337

	2014	TUR	0.421782
	2013	TUR	0.289432
	2012	TUR	0.401161
	2011	TUR	0.453391
	2010	TUR	1
	2009	TUR	1
	2008	TUR	0.525199
	2007	TUR	0.89387
	2006	TUR	0.449514
Garanti Faktoring A.S	2015	TUR	0.226643
	2014	TUR	0.240797
	2013	TUR	1
	2012	TUR	0.379364
	2011	TUR	0.536116
	2010	TUR	0.593877
	2009	TUR	0.555459
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Deniz Leasing AS-Deniz Finansal Kiralama AS	2015	TUR	0.904365
	2014	TUR	0.680684
	2013	TUR	0.808475
	2012	TUR	0.607174
	2011	TUR	0.716484
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Birlesik fon Bankasi AS	2015	TUR	0.841679
	2014	TUR	1
	2013	TUR	1
	2012	TUR	1
	2011	TUR	1
	2010	TUR	0.864554
	2009	TUR	0.856759
	2008	TUR	1
	2007	TUR	0.975751
	2006	TUR	0
Ziraat Finansal Kiralama AS	2015	TUR	0
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0

	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
Bankpozitif Kredi ve Kalkinma Bankasi AS-C Bank	2015	TUR	0.388966
	2014	TUR	0.29084
	2013	TUR	0.276013
	2012	TUR	0.325429
	2011	TUR	0.39163
	2010	TUR	0.409551
	2009	TUR	0.522198
	2008	TUR	0.35351
	2007	TUR	0.366712
	2006	TUR	0.280264
Rabobank A.S.	2015	TUR	0.260957
	2014	TUR	0
	2013	TUR	0
	2012	TUR	0
	2011	TUR	0
	2010	TUR	0
	2009	TUR	0
	2008	TUR	0
	2007	TUR	0
	2006	TUR	0
National Bank of Kuwait S.A.K.	2015	KU	1
	2014	KU	1
	2013	KU	0.882188
	2012	KU	0.954025
	2011	KU	0.855664
	2010	KU	0.837231
	2009	KU	0.872394
	2008	KU	0.913613
	2007	KU	1
	2006	KU	0.946862
Kuwait Finance House	2015	KU	0.977825
	2014	KU	1
	2013	KU	1
	2012	KU	0.979229
	2011	KU	0.997026
	2010	KU	1
	2009	KU	0.908146
	2008	KU	0.933196
	2007	KU	0.840801
	2006	KU	1
Burgan Bank SAK	2015	KU	0.887239
	2014	KU	0.942015
	2013	KU	0.976323

	2012	KU	0.911036
	2011	KU	0.925214
	2010	KU	0.889932
	2009	KU	0.889858
	2008	KU	1
	2007	KU	0
	2006	KU	0
Gulf Bank KSC (The)	2015	KU	0.816464
	2014	KU	0.79611
	2013	KU	0.770087
	2012	KU	0.789389
	2011	KU	0.754344
	2010	KU	0.758385
	2009	KU	0.763489
	2008	KU	0.839528
	2007	KU	0.805124
	2006	KU	0.80756
Kuwait Fund for Arab Economic Development	2015	KU	0
	2014	KU	0
	2013	KU	0
	2012	KU	0
	2011	KU	0
	2010	KU	0
	2009	KU	0
	2008	KU	0
	2007	KU	0
	2006	KU	0
Al Ahli Bank of Kuwait (KSC)	2015	KU	0.726924
	2014	KU	0.694811
	2013	KU	0.700966
	2012	KU	0.694483
	2011	KU	0.71602
	2010	KU	0.703351
	2009	KU	0.751671
	2008	KU	0.736695
	2007	KU	0.79961
	2006	KU	0.794568
Commercial Bank of Kuwait K.P.S.C. (The)	2015	KU	0.8486
	2014	KU	0.904119
	2013	KU	0.843403
	2012	KU	0.840607
	2011	KU	0.849832
	2010	KU	0.771104
	2009	KU	0.759771
	2008	KU	0.927386
	2007	KU	0.984837

	2006	KU	0.872981
Ahli United Bank KSC	2015	KU	0.997681
	2014	KU	0.933088
	2013	KU	0.929028
	2012	KU	1
	2011	KU	1
	2010	KU	1
	2009	KU	0.739568
	2008	KU	0.741197
	2007	KU	0.841457
	2006	KU	0.914356
Boubyan Bank KSCP	2015	KU	0.818708
	2014	KU	0.799887
	2013	KU	0.839769
	2012	KU	0.799467
	2011	KU	0.754527
	2010	KU	0.706068
	2009	KU	0.750627
	2008	KU	0.760744
	2007	KU	1
	2006	KU	1
Kuwait International Bank	2015	KU	0.905736
	2014	KU	0.912981
	2013	KU	1
	2012	KU	0.840312
	2011	KU	0
	2010	KU	0
	2009	KU	0
	2008	KU	0
	2007	KU	0
	2006	KU	0
Warba Bank	2015	KU	0.711733
	2014	KU	0.706787
	2013	KU	0.85318
	2012	KU	0.905549
	2011	KU	1
	2010	KU	0
	2009	KU	0
	2008	KU	0
	2007	KU	0
	2006	KU	0
Industrial Bank of Kuwait K.S.C.	2015	KU	0.599844
	2014	KU	0.644941
	2013	KU	0.522979
	2012	KU	0.485729
	2011	KU	0.501449

	2010	KU	0.430601
	2009	KU	0.411909
	2008	KU	0.441943
	2007	KU	0.533737
	2006	KU	0.455878
Banque Internationale Arabe de Tunisie - BIAT	2015	TUN	0.971913
Banque Internationale Arabe de Tunisie - BIAT	2014	TUN	1
Banque Internationale Arabe de Tunisie - BIAT	2013	TUN	1
Banque Internationale Arabe de Tunisie - BIAT	2012	TUN	0.996969
Banque Internationale Arabe de Tunisie - BIAT	2011	TUN	1
Banque Internationale Arabe de Tunisie - BIAT	2010	TUN	1
Banque Internationale Arabe de Tunisie - BIAT	2009	TUN	1
Banque Internationale Arabe de Tunisie - BIAT	2008	TUN	0.951212
Banque Internationale Arabe de Tunisie - BIAT	2007	TUN	0.884931
Banque Internationale Arabe de Tunisie - BIAT	2006	TUN	0.878312
Banque Nationale Agricole	2015	TUN	0.996334
	2014	TUN	0.989689
	2013	TUN	0.905006
	2012	TUN	0.915879
	2011	TUN	0.854509
	2010	TUN	0.92423
	2009	TUN	0.763415
	2008	TUN	0.788851
	2007	TUN	0.785389
	2006	TUN	0.824394
Société Tunisienne de Banque	2015	TUN	1
	2014	TUN	1
	2013	TUN	0.982919
	2012	TUN	1
	2011	TUN	1
	2010	TUN	0.989984
	2009	TUN	1
	2008	TUN	1
	2007	TUN	1
	2006	TUN	0.980145
Amen Bank	2015	TUN	0.870595
	2014	TUN	0.90375
	2013	TUN	0.856504
	2012	TUN	0.945892
	2011	TUN	0.777486
	2010	TUN	0.793175
	2009	TUN	0.775151
	2008	TUN	0.77748
	2007	TUN	0.758547
	2006	TUN	0.725715
Banque de l'Habitat	2015	TUN	0.69849

	2014	TUN	0.755951
	2013	TUN	0.957687
	2012	TUN	0.892935
	2011	TUN	0.867728
	2010	TUN	0.957296
	2009	TUN	0.747008
	2008	TUN	0.761781
	2007	TUN	0.688911
	2006	TUN	0.646006
Attijari Bank	2015	TUN	0.869839
	2014	TUN	1
	2013	TUN	0.99237
	2012	TUN	0.952178
	2011	TUN	0.969811
	2010	TUN	1
	2009	TUN	0.967143
	2008	TUN	0.817214
	2007	TUN	0.823345
	2006	TUN	0.791924
Arab Tunisian Bank	2015	TUN	0.787545
	2014	TUN	0.873139
	2013	TUN	0.882722
	2012	TUN	0.889636
	2011	TUN	0.872326
	2010	TUN	1
	2009	TUN	0.966279
	2008	TUN	0.963027
	2007	TUN	0.821151
	2006	TUN	0.781413
Banque de Tunisie	2015	TUN	0.683156
	2014	TUN	0.732292
	2013	TUN	0.703715
	2012	TUN	0.764349
	2011	TUN	0.575937
	2010	TUN	0.512695
	2009	TUN	0.575387
	2008	TUN	0.498322
	2007	TUN	0.449027
	2006	TUN	0
Union Internationale de Banques	2015	TUN	0.925251
	2014	TUN	1
	2013	TUN	1
	2012	TUN	0.959199
	2011	TUN	0.982265
	2010	TUN	1
	2009	TUN	1

	2008	TUN	1
	2007	TUN	0.852413
	2006	TUN	0.807752
Union Bancaire pour le Commerce et l'Industrie SA UBCI	2015	TUN	0.89055
	2014	TUN	0.890783
	2013	TUN	0.866107
	2012	TUN	0.78406
	2011	TUN	0.944473
	2010	TUN	0.980512
	2009	TUN	0.905654
	2008	TUN	0.89454
	2007	TUN	0.860126
	2006	TUN	0.810254
Banque Tuniso - Koweitienne-BTK	2015	TUN	0.508514
	2014	TUN	0.489917
	2013	TUN	0.580325
	2012	TUN	0.641489
	2011	TUN	0.589247
	2010	TUN	0.550319
	2009	TUN	0.494398
	2008	TUN	0.392025
	2007	TUN	0.423324
	2006	TUN	0.403225
Albaraka Bank Tunisia	2015	TUN	0.705607
	2014	TUN	0.781823
	2013	TUN	0
	2012	TUN	0
	2011	TUN	0
	2010	TUN	0
	2009	TUN	0
	2008	TUN	0
	2007	TUN	0
	2006	TUN	0
Banque Zitouna	2015	TUN	1
	2014	TUN	1
	2013	TUN	1
	2012	TUN	0.917716
	2011	TUN	1
	2010	TUN	0
	2009	TUN	0
	2008	TUN	0
	2007	TUN	0
	2006	TUN	0
Tunis International Bank	2015	TUN	0.882214
	2014	TUN	0.852621
	2013	TUN	0.838836

	2012	TUN	0.900052
	2011	TUN	0.797773
	2010	TUN	0.786996
	2009	TUN	0.718995
	2008	TUN	0.73608
	2007	TUN	0.671171
	2006	TUN	0
Qatar National Bank Tunisia	2015	TUN	0.655266
	2014	TUN	0.588235
	2013	TUN	0.463774
	2012	TUN	0.651414
	2011	TUN	0.455693
	2010	TUN	0.462001
	2009	TUN	0.430582
	2008	TUN	0.45839
	2007	TUN	0.441899
	2006	TUN	0.395871
Tunisie Leasing	2015	TUN	0.466331
	2014	TUN	0.473014
	2013	TUN	0.436265
	2012	TUN	0.454514
	2011	TUN	0.385327
	2010	TUN	0.369545
	2009	TUN	0.336405
	2008	TUN	0.311964
	2007	TUN	0.283733
	2006	TUN	0.222613
North Africa International Bank - NAIB	2015	TUN	0.928885
	2014	TUN	0.657434
	2013	TUN	0.483048
	2012	TUN	0
	2011	TUN	1
	2010	TUN	0.716723
	2009	TUN	1
	2008	TUN	1
	2007	TUN	1
	2006	TUN	0.885414
Caisse de prêts et de soutien des collectivités locales-CPSCL	2015	TUN	0
	2014	TUN	0
	2013	TUN	0
	2012	TUN	0
	2011	TUN	0
	2010	TUN	0.948345
	2009	TUN	0.923955
	2008	TUN	1
	2007	TUN	1

	2006	TUN	0.14309
Alubaf International Bank	2015	TUN	0
	2014	TUN	0
	2013	TUN	0
	2012	TUN	0
	2011	TUN	0
	2010	TUN	0
	2009	TUN	0
	2008	TUN	0
	2007	TUN	0
	2006	TUN	0
STUSID Bank	2015	TUN	0.553228
	2014	TUN	0.488029
	2013	TUN	0.503773
	2012	TUN	0.404443
	2011	TUN	0
	2010	TUN	0
	2009	TUN	0
	2008	TUN	0
	2007	TUN	0
	2006	TUN	0
Banque de Tunisie et des Emirats SA	2015	TUN	0.528745
	2014	TUN	0.521562
	2013	TUN	0.458988
	2012	TUN	0.455075
	2011	TUN	0.371632
	2010	TUN	0.387704
	2009	TUN	0.33592
	2008	TUN	0.297107
	2007	TUN	0.248573
	2006	TUN	0.201254
Banque Tunisienne de Solidarité	2015	TUN	0.499816
	2014	TUN	0.567611
	2013	TUN	0.485684
	2012	TUN	0.420753
	2011	TUN	0.371226
	2010	TUN	0
	2009	TUN	0
	2008	TUN	1
	2007	TUN	0
	2006	TUN	0
Banque Tuniso-Libyenne	2015	TUN	0.670682
	2014	TUN	0.54395
	2013	TUN	0.52401
	2012	TUN	0.497628
	2011	TUN	0.452363

	2010	TUN	0.552431
	2009	TUN	0.489927
	2008	TUN	0.504483
	2007	TUN	0.445856
	2006	TUN	0.39532
Arab Banking Corporation - Tunisie	2015	TUN	0.67189
	2014	TUN	0.635668
	2013	TUN	1
	2012	TUN	1
	2011	TUN	1
	2010	TUN	1
	2009	TUN	0.716059
	2008	TUN	0.742287
	2007	TUN	0.626533
	2006	TUN	1
Citibank NA	2015	TUN	0.469216
	2014	TUN	0.449169
	2013	TUN	0
	2012	TUN	0
	2011	TUN	0
	2010	TUN	0
	2009	TUN	0
	2008	TUN	0
	2007	TUN	0
	2006	TUN	0
Wifack International Bank	2015	TUN	0.222252
	2014	TUN	0.201777
	2013	TUN	0.208349
	2012	TUN	0.169474
	2011	TUN	0.155238
	2010	TUN	0.162009
	2009	TUN	0.14095
	2008	TUN	0.139049
	2007	TUN	0.319103
	2006	TUN	0
Banque Franco-Tunisienne	2015	TUN	0.988546
	2014	TUN	0.854565
	2013	TUN	0.880637
	2012	TUN	0.948121
	2011	TUN	0.537877
	2010	TUN	0.553017
	2009	TUN	0.672024
	2008	TUN	0.652188
	2007	TUN	0.636225
	2006	TUN	0.620659